

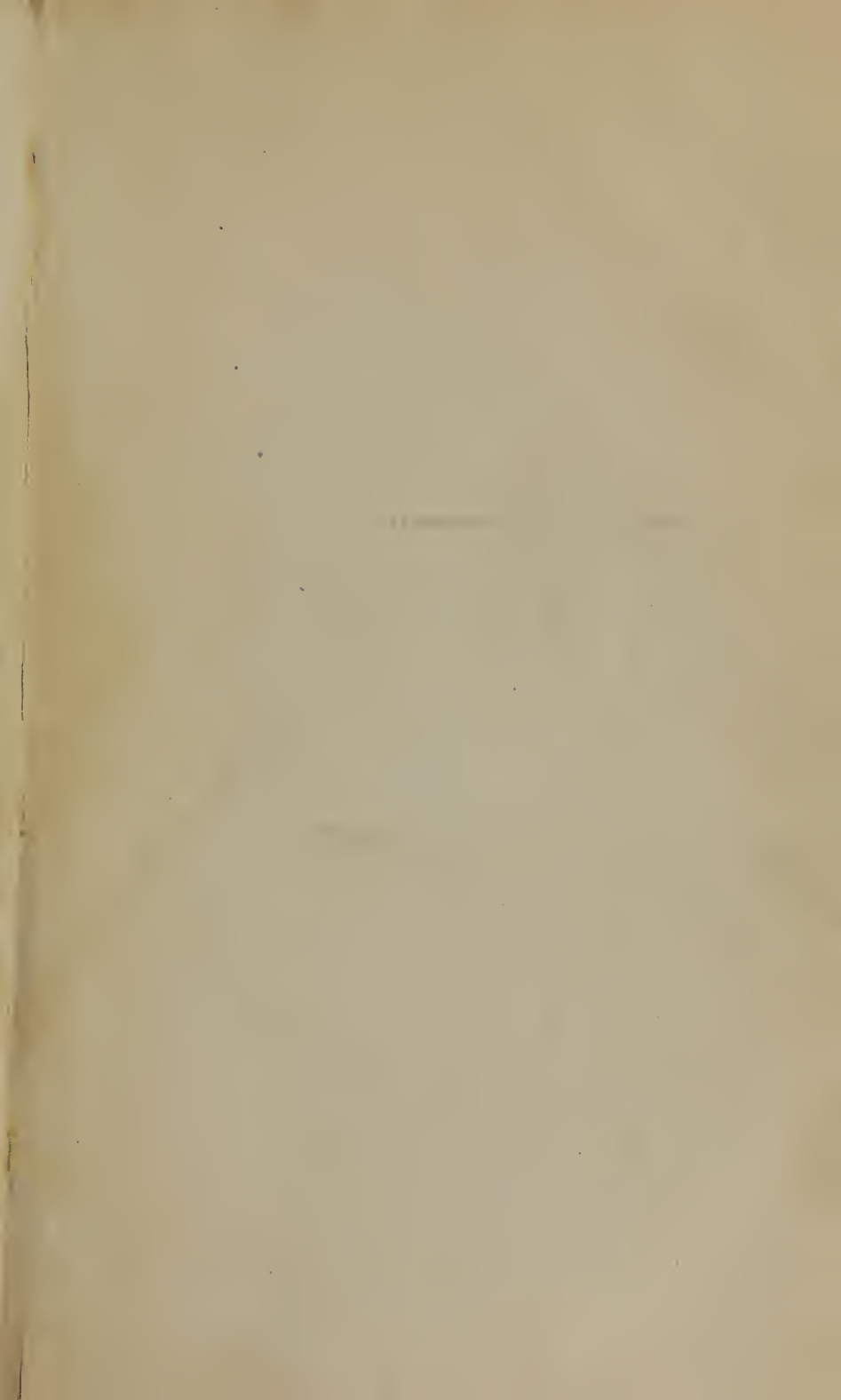


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ANNEX



PHILOSOPHY
OF
ANIMATED EXISTENCE;
OR,
SKETCHES OF LIVING PHYSICS:
WITH
DISCUSSIONS OF PHYSIOLOGY PHILOSOPHICAL.
TO WHICH IS ADDED A BRIEF
MEDICAL ACCOUNT
OF THE
MIDDLE REGIONS
OF
GEORGIA.

BY
✓
JOHN B. GORMAN, M.D.

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TO
THOMAS B. GORMAN, M.D.,
OF MACON,

MY BROTHER;

COMPANION AND FELLOW-STUDENT OF MY EARLY YEARS;
MY BEST AND CONSTANT FRIEND THROUGH LIFE;
ON ACCOUNT OF HIS LOVE AND CULTIVATION OF PHILOSOPHY, ELEGANT
LETTERS AND THE SCIENCE OF MEDICINE;

AND IN TESTIMONY
OF THE RESPECT AND FRATERNAL AFFECTION I BEAR HIM;

THIS WORK,

IN WHICH HAS BEEN ATTEMPTED, ON THE VARIOUS SUBJECTS
TREATED, TO BRING THE IDEAS UP TO THE STATE OF
LIVING KNOWLEDGE, IS INSCRIBED BY

THE AUTHOR.



PREFACE AND INTRODUCTION.

THE slightest observation evinces the provisions of existence in any living being are only partially contained in itself. 1. All such beings depend upon parents or existences similar to themselves, from which they take origin. 2. The materials of their structures are momentarily derived from the soil or media, in which it is proper for them to exist. 3. Their composing organs chiefly are only special contrivances formed in relation to this soil or these media, upon the dynamical properties of which or laws of motion, the play of most all their functions are directly predicated—functions in themselves, which are only the immediate reciprocal reactions of these organs upon these media. 4. The part of their organs not formed to play in the stimulations of the inhabiting media, relate to other forms of matter of the dynamical system, as heat, light, which stimulate their functions; or to some property of this system, whose activity they modify, restrain, as the valves of the large ascending veins in man and some other animals restrain the universal weight or gravitation. 5. Considered, consequently, in their pure organic and mechanical relations, they are merely special parts of the soil and media, where they exist, or of their own and other worlds; but in the special forces by which they react for functions, and affect the movements of the general laws of matter, they are separate and distinct.

The philosophy of animated existences, therefore, however restricted, is only a particular branch of general physics existing in close union, upon the profound study of which all the enlightened knowledge of this philosophy essentially depends. I study the bearings of general physics on the

subject I treat. My plan, therefore, carried out would form an encyclopedia of science. Consequently, I write sketches, in which I present what appears most important to be considered.

That the science of organic beings is only a particular part of the universal science of nature—that all science, knowledge, in a word, is but one; and that all the distinctions philosophers make, are more or less arbitrary, but useful and necessitated for convenience, is thus evidenced. To meditated observation the system of the world presents but three great classes or orders of phenomena,* which are the *material*, the *vital* and the *intellectual*, and relate to three great, original dynamical forces. As the causes of these phenomena the mind infers these *forces* or *beings*, which are *matter*, *life* and *intelligence*. These phenomena with the causes, forces or beings, whence they emanate, and to which the mind refers them, constitute this entire system, or all the perceptible objects of nature.

Pure science only relates or is concerned with phenomena, or what is manifest; and, since these form three distinct orders, correspondingly there are three distinct sorts of science, which may be named from the causes of the phenomena *hylography*, *zoonomy* and *psychology*. These form the first and most simple division of which science admits.

But reflected observation further shows, that although these causes, beings, are distinct from one another, they are not independent in action, but united in their dynamical arrangement, which constitutes them reciprocal in effort, and, consequently, one in their phenomena. This unity of phenomena arising from the great reciprocal action of the triple, dynamical forces of the world, as I may call them, obliterates the threefold distinction of science, and makes it but one.

I repeat, I contemplate organic beings, in my way, in relation to hylography, zoonomy, and psychology—to the

* From *φαινόμενα*: I appear—what is manifest to our senses. We have no word as *cryptomena* to express what is opposite to phenomena, or concealed from our senses.

great triple action, or general physics. In the order of research, 1. I remount to the first being, and appreciate his logical idea. He is the first in the perceptible series of causes, of which the phenomena of nature are the manifestations of activity. He originally impressed, and constantly vivifies the action of this series extending out from Himself, which makes all activities primarily depend upon Him. This series with himself, or He and the laws of nature not experimental, form the inexorable domains of science, are *the cryptomena*.

2. I study matter, the first material, the most ancient means of complicated, organic life. The motions of matter in space are double, and reciprocally dependent. The oneness which its system implies, with this sort of motion, impresses upon us the idea of life. This is the first or elder life, so much exaggerated by antiquity. Upon this life, as just intimated, is most manifestly predicated the life by a chemifying force or the life organic.—Hylozoick contemplations—Life is a common property; nature is the scene of universal animation. All the forms of existence, through the action of the secondary laws, enjoy vitality in a living Creator.

3. Life by organization. This life is a special and original force of nature, and indestructible. Organization is the manner of existence, and manifestations. Only a portion of the aqueo-terrestrial mass appears to be subjected to its empire. I consider it in relation to the chemical forces, to the universal weight, to its own economy in the series of its forms, and in the fluctuations of ages.

If the force which impels matter in space, and that which governs in its morphologic revolutions, be double, the action of the chemifying force of animal and vegetable vitality, is likewise double; so that nature animates with the same mode of motion all her mineral and organic existences.

And 4. Mind. Like organic life, mind is a force of original creation. In its activity it is subordinate to the molecular movement of organic formation; and is modified in all the living forms. I sketch it in its various relations.

I avow it.—I have composed this work for the young philosophers of my country—for those, who are leaving the university, and forming opinions upon general topics of science and philosophy—and for all who take delight in free physical research. Those, who have a passion for minute anatomical description, and formal routine discussion, will be disappointed; but those who love to contemplate freely man and other beings like him out on the great field of nature, responding by their special laws to the general laws of the universe, displaying the phenomena of their existence, accomplishing its end, and passing away in the courses of their world or the torrent of ages, if nothing new be found, it is hoped from blamable faultiness, will not be altogether deprived of participating with me the pleasure of these high contemplations.

If this little performance, but far too humble compared with my wishes of what it should be, in the feeblest degree, should stimulate to the forward motion of the science of my dear country, *the end of all my study*, the reward were too rich for the deservings of my labor. But if the reflections here, should lead any to a more protracted and profound study of the different branches of knowledge, which shed their light on the healing art, and awaken in any an interest and taste for general physics on which I have touched, my gratification will be complete.

In the eyes of some, the title of this work may appear ambitious, but it is not always so easy, as D'Israeli (*Curiosities of Literature*) has correctly enough said, to fix upon a title. This is more especially the case, where the plan of the performance like this, necessitates the rapid, I may say, instantaneous investigation of so many different subjects, by which it is constituted. I can only say, no effort has been spared to make the body of the work harmonize with the title prefixed.

I may observe here, in consequence of many works passing rapidly through so many editions, I have not always pointed out the page of authors, to whom I simply refer in descantation.

The medical account of Georgia, which is added to the work, is so small, that it cannot be in the way of the general reader.

As respects style, which, according to Count Buffon, "makes the man," I have only aimed at clearness, and the rapidity of expression of thought. If any inequalities, in this respect, should appear, they must have arisen from my having to study much almost at the same moment in different languages in reviewing the materials collected for my work. And, after all my care and labor to be correct, I am but too conscious of the many imperfections it contains—imperfections, too, many of which were unavoidable from the difficult nature of the subjects treated—Nor do I know how the ideas this book contains may appear in the eyes of other mortals, who will judge me. It is, therefore, I confess, not without a sense of fear, and the anxiety which is natural, that it is offered to the world.

ROCKY HEIGHT, TALBOT, GEORGIA.

November 25, 1844.

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PHILOSOPHY, ETC.

BOOK I.

VARIETY OF BEINGS—THEIR RELATIONS WITH ONE ANOTHER.

AN original Creator—God—is nature's fundamental idea. The active reason of men of all ages, countries, whether they have cultivated sciences, and become civilized, or persevered in barbarism, has alike reached the conception, or substituted something in the place of this great idea; beyond which contemplation cannot pass. The order in which the phenomena of all physical existences, are presented to us; the manner in which our minds appear framed to study these phenomena, lead us up in antiquity, step by step, to behold this *Idolum nature magnum*.

The God of reason as of inspiration, is the first Being, alone original. There must have been a period, when He existed in solitude. All others have sprung from the Divine Wisdom and industry. Excepting our material economy, we know not in what ages or durations they came forth. In space rich,—beautiful for its worlds—we see the immensity of matter. The more our knowledge improves, the more we become convinced of the feebleness, inadequacy of our idea of the actual extent and limits. From the influences of these worlds upon our senses and on our system, we simply know they

are material; but know not the variety of other beings they may contain.

The matter of our own sphere exists constantly in two states, of which it appears only to be susceptible; the *mineral* and the *organic*. The mineral is the state, in which the properties inherent, inseparable from it, place and maintain it in nature. This sphere constituting not a whole in itself, these properties combine to achieve its cosmic functions or relations in the economy of which it is a constituent part.

The organic state, foreign to the achievement of all the congenite properties, is due to a separate force. This substantive force manifests itself to be distinct from the material properties, by the successful opposition it offers to them, and by the decided difference which exists between mineral and living bodies.

Intelligence is another force not less distinct and substantive. Its development and entire activity, are subordinate to the molicular, vital movement.

Three classes, then, of forces—*beings*;—or *matter*, *life* and *intelligence*, with their phenomena constitute nature with us.

CHAPTER I.

GENERAL PHENOMENA OF ANIMATED EXISTENCE.

ALL created beings continue to be what they are—exist—by virtue of the acts, they constantly put forth. These acts distributed out, impressed at the hour of creation, are special to each. Thus a star, a man, a microscopic animalcule;—the towering cedar, the humble cryptogame—are subjected to the same condition. There are no royal houses in nature, where beings repose, or enjoy repose after labour. They all participate in the ceaseless struggle; persevere in continual excitement. This excitement is the essence of their being. In it they all, in their own way, enjoy life from the hands of their living Creator; live the great, the beautiful life of nature.

But it is not the phenomena of this universal life, only an infinitely small portion, and a particular mode of it, we are here to contemplate. In this particular mode, we find the rank and place, we with our fellows, occupy. We live amid the scene of the mineral changes and revolutions of the matter of our planet. We cannot but perceive our existence is connected closely with the causes of these changes. The slightest observation of the general phenomena of matter, very moderate inspection of the physical laws, are sufficient to convince us, the star in space, on which we dwell does not contain all, but only a limited portion of the conditions or means absolutely necessary to our existence. Its intercourse, associations with its fellow-stars;—the life it enjoys itself—completes these means.

Our sort of animation parasitic, is, therefore, only a special form engrafted on the older life of nature. It is

the modification of this life by a substantive force, the force of organization. This life by giving matter forms foreign to the natural tendencies; endowing them with separate and special properties; combining them into reciprocally active wholes;—or this life by organization, differs exactly from the great, parent model. The force of the one progresses without exhaustion in eternal equilibrium; that of the other is never exactly the same in intensity and operation. Against this latter force, frail and delicate, the matter subjected to its dominion forever tends to rebel and escape. Commencing feeble at first, it has its limits fixed in all living species, beyond which it cannot pass. Thus generation and death come to form part in its economy.

One of the most notable conditions, therefore, in all animated existences, is, to use the sacred expression, that they come from the dust and return. In this double movement, all vitality keeps pace with the flight of the celestial spheres,—plays through time. In this flight are maintained the eternal youth and beauty of the living forms, personified by antiquity in the person of Hebe, daughter of the most ancient of beings.

Nature seems to manifest no cares for the preservation of her fair creations of life. She constantly prepares for us, frightful, hated deaths. She flatters with beauty and strength, but she will not hear our cries, entreaties; does not pity the hideous features, the wrinkled face, the stiffened form, she is preparing for us;—the solitude of the cold sepulchre. She procures death for all; to us the most frightful, because formed the most sensible.

Her great pleasure, her constant disposition, is, to return, and tread again in her own footsteps; create existence, rekindle the breath after the same models, she has destroyed. In the successive evolution and extinction of generations, she limits herself to the repetition of the same, unvarying series of efforts; passes round in

the eternal circle of action. And the voice of her august Creator, rings forever throughout her living empire, "From the dust thou art, and unto dust thou shalt return."

But what is this dust? mighty, immovable base of all animated beings, round whose great axis, they all turn! This dust?—but the earth herself; over whose sterile face passed anciently the breath of the Almighty. Then the grass first shot up its juicy spires; the little flowers opened their tender petals to catch the roscid drops; and the tall trees spread out their voluminous foliage beneath the clouds;—the plummy races began to flutter in the air; the young leviathan, play in the waves;—the great zoological life came forth:—and man appeared among them their crowned sovereign.

The dust, then, which we bring with us into life, which we sacredly deposit in the tomb afterwards, enjoyed, at first, only the simple life, the life of all matter. But since generations began in all the living races, the dust of the earth has lived a new life from the Divine Breath or the organizing nature, which has continued.

SECTION I.

IS THERE OCCASIONALLY NEW LIVING SPECIES?—SPONTANEOUS GENERATION.

LIKE Newton's astronomical world, which, by its own operations tends to destruction; and requires at periodical times, the correcting touch of the creating hand, does the world of life operate its own ruin?—do the old races expire of age or accident, and are new ones occasionally created to keep it up?

Man climbing aloft in the regions of the sciences, beholding the reciprocal unity, general subordination; the inflexible laws, which bind all in the great republic of

the universe, his mind is struck with a vertiginous movement. The immensity of Nature's operations, the frightful durations, through which her unwearied action continues on, overpower all his contemplation. But his ambition can never be overpowered. In these sciences he struggles continually with nature. He desires to be present with her, and witness all her doings. He looks on his mind as forming the visible horizon of the invisible universe. He forgets that very few of these operations are subjected to his observation; that he witnesses these few but very imperfectly;—he forgets the feebleness, nothingness of his own thought; and attempts to retrace the great ages of the world.

Imbedded deep in the strata of the earth, and amid solid rocks, he beholds the remains of the *Edentata*, the gigantic *Pachydermata*, the *Sauria*, *Ophidia*.—At various depths beneath the surface, on the greatest elevations above the seas, the fossil relics of Neptunian life, are presented to his observation. Nay, so abundant are these relics, that they appear to constitute largely the solid crust of our planet, and give to it much of its present form, and appearance.

Many of the congeners of these relics do not exist now in any of the seas which are; and a goodly number of these *Sauria*, *Ophidia*, *Pachydermata*,—that existed formerly, is now found alive in no country on earth. All the monuments, therefore, show, the life of our world is of an extremely great age, stretches back into the annals of a dreary, incomprehensible antiquity:—That the *races die*, “*thin out*,” and new ones must occasionally be supplied by creation, accommodated to the new epochs of relabent time. Thus the great, living economy, coeval with our astronomical world, progresses through the duration of time by the perpetual generation of the individuals, death destroys; and by the occasional *divine creation* of new races, or “*transmutation of species*.” These

conclusions vast in themselves occupy immense ground. They are the conclusions of MM. Buffon, Lamarck, Cuvier, and other great philosophers. But much gloom, heavy shades hang about them. The ground on which they rest can never be all explored. The facts of paleontology—zoological history,—appear to testify, that many of the old races have perished and disappeared, and that new ones have been introduced.

But we may suppose, as yet, even the outline of the living economy, has been only very imperfectly explored. We know but partially the elements of which it is composed. Even in modern times, in the MARSUPIALIA—*Macropus minor*, *Didelphis gigantea*;—MONOTREMATA—*ornithorhynchus paradoxus*, *ornithor. setosus*; New Holland has presented new descriptions of living creatures. On the floors of the seas and oceans, in the solitudes of central Africa, some parts of boreal Europe and Asia, the desert lands of the two Americas, in many of the Oceanica but little explored, there may exist many creatures, even of great size, unknown to all zoography.

If then the zoological philosopher know not the amount of life in being, and the number of forms in which it exists, he must be illy prepared to decide upon the amount and the number of species, which have been miscarried by time, and struck from the living calendar.

If new races, occasionally, are really created, since it is the work of an Infinite Being, is it we may be living in the infancy of the world, and are ignorant of the duration, the original power of creation is consuming, in bringing the living empire to its ultimate and stationary perfection? Or is such perfection a part of primeval nature? May not these new creations be presented to our eyes, from our manner of studying this economy, as it is unfolded and brought forward in the great action of time? We shall notice these topics directly.

But ourselves, apart, we know not the end or use of any living being, nor their proportion with themselves and the balance of the universe. We are ignorant of the great causes, which necessitated their existence. They are presented to us without their reasons,—philosophy. We behold them with ourselves dashing onward in the eternal torrent of ages. Nature advances perpetually in her steady course. She regards all time as one unbroken duration. We break time into epochs to define and circumscribe her actions. Our reason progresses on her backward course; her phenomena are presented in the inverted order. She always combines in her action, but we decompose. We cannot see things *in natu*, as she brings them forth. We look at her through the epochs, we make. We take for the whole what she simply means for a part. We complete her designs, when she is only commencing them. We see but her broken, distorted image.—

The Marquis De Laplace corrected the astronomical error of Newton. One day zoology may have her Laplace, who will demonstrate, that the living races set up in the first order of creation, incomprehensible in the great mutation and transition of time, never perish;—that the world of life, like that of matter, perfect in its own preservation, may progress eternally without decay or diminution, unless interdicted by the Divine will.

Time always leaves behind it, an obscurity fearful to truth and science. It is in this obscurity, the zoological philosopher gropes, tracing the ancient history of life. The remains of the living structures inclosed in rocks and the terrestrial strata, are the venerable monuments, he consults. The rocks and beds on which all the others rest, he assumes to be the oldest; and judges of the age of the balance by their super-position. He compares the organic remains of the older with the more recent for-

mations; and discovers great and decided changes have taken place.* In the more ancient strata and fossiliferous rocks, he beholds only the relics or prints of ferns, reeds; the *radiata*, *molusca*;—the first rude elements of a living world: in those more recent, the dicotyledonous tribes, the *vertebrata*;—the more perfect among plants and animals. Finally the system of life existing now in our planet, has completely changed in all its members; and corresponds no longer with the system or systems, which have been.

There is life; the oldest forms of matter are marked with its unequivocal traces; life has always been. He compares, examines the monuments in all their bearings to discover where the path leads, in which nature has travelled. No age has ever witnessed the new creation of a living being. The existing organic forms must have descended from those of the primeval creation, through a continual and successive transmutation of species.

But no philosopher can point to the intervening types of organization, which connect the existing species with those of the old fossiliferous rocks. This theory of transmutation, therefore, presents prodigious *lacunæ*, which no reason or scientific industry can ever fill up.†

* Vid. Cuvier's *Recherches sur les Ossemens de Quadrupedes*.

† In a recent work, G. Penn, Esq. has marshalled much learning and criticism, and elevated himself against MM. De Luc, Cuvier, all these great men, who have shed so much modern light on the history of the planet. He attacks in every part, the whole theory over which we are here passing. His brilliant arrows seem to fly at every point, except those at issue. Too theological, his reasoning must be judged inapplicable. The fundamental truths of this theory, attested by our senses, must continue with the facts.

Among other things, his book appears more a finished eulogium on the genius of Bacon and Newton, than an argument seriously about the *Terra invisibilis et incomposita*; and the *Magnæ ossa parentis,—mundi*. Vid. Comparative Estimate of the *Mineral* and *Mosaical* geologies, passim.

In the absence of the conditions necessary to the development of life, experience has proved it possible, nay probable, the *seeds* of plants and *ova* of animals, will continue through great periods, the exact limits unknown, and still be evolutionable — prolific. Since, therefore, only the rudimental forms of life appear to have existed in the infancy of nature, in place of these *mutations* and successive creations, if we suppose the *organizing nature* or *plastic vital principle*, peculiar to each of the great vertebrated and other more perfect families, was intrusted to some of the durable forms of matter, as future life is to these seeds and ova; which would develop in the progressive changes of the world, and start into organic being with the succession of generations; it would correspond better with sacred history, and accommodate all the immovable facts of geognostic zoology.

Whether, however, by transmutations, more recent creations, or the *amorphous ova*, I have supposed for all the new species; the complete and successive alterations, themselves, debatable as other things connected with them may be, remain indisputable.

CAUSES.—Changes from the great astronomical movement; revolutions on the face of the planet itself; slow molecular fluctuations, are alleged to be incompatible with a living economy permanent in its genera and species. The new conditions through which matter is passing in the great flights of time, it is asserted, tend to the extinction of the ancient forms of life, and necessitate others with constitutions adapted to these material vicissitudes.

We cannot here discuss these prodigious topics. They will meet us again. We shall content ourselves with observing,—the inclination of the earth's axis, which regulates, modifies the solar light and heat in all climates, has ever made a great figure in living archeology. From

calculations, some philosophers maintain, the terrestrial axis, in a long series of years, will regain its equilibrium in the Ecliptic, and again stand even in its plain.—That then, from the unchangeableness or uniformity of the temperature of all climates, in all seasons great alterations will be consummated throughout the living kingdom.

The axes of the other planets do not correspond with the Ecliptic plane. Nay, the poles of some of them, are depressed much lower than ours; so that their axes stand nearly vertical or cut this plane at almost right angles.

Why, then, should we suppose our Southern pole has ever been depressed by some accidental cause? Why not rather think, at the hour of creation, our planet was orbited with its axis inclined as our astronomy finds it.—And when we consider the rotundity of its figure,—that light can travel only in straight lines:—when we appreciate the immense consequences, which result from this position of its axis, we should think the more, this *inclination* was intentional, and a part in the original contrivance. Indeed, all philosophy were infinitely easier, could man think and foresee like his Divine Creator.

The exact periods, in which our astronomical matter, in its great flights through space, completes its revolutions, show the force by which it is animated, operates uniformly. The precise correspondence of the great cycles of time, measured out by these revolutions, evinces, that since astronomical observation and history commenced, no permanent changes have occurred in our material economy:—that this economy maintains the equilibrium of its force, and if slight alterations do occur, they are only temporary, their causes being evanescent.

We have, therefore, good grounds to conclude upon the high probability, that all the bodies subjected to the solar autocracy, have persevered through all time with great uniformity; and that any system of life, it would maintain at any one period, would be maintained *ad in-*

definitum. It is highly improbable, then, life has ever perished out and disappeared from astronomical causes.

But what proof exists, that the matter of our planet undergoes permanent changes, in the long flights of time, from the molecular movement, incompatible with the duration of the living species? In the imponderable attractions, it is armed with prodigiously energetic forces, prolific causes of changes. Everywhere exists the most indubitable testimony, its whole face has, more than once, been completely broken up, and undergone alteration. The facts and reasonings of Baron Cuvier* establish this position more clearly than any of his predecessors, and command respect and admiration for his genius.

It is unphilosophical to think the revolutionary causes have become quiescent; or that our world is possessed of active forces at one time, which it loses at another. It is to be regarded as a definite, unvarying quantity, both in substance and in energy. The causes, therefore, which commenced the first changes of its surface in the highest antiquity, are still in operation; and the face we occupy now, can not continue to be the face, on which will dwell all the future generations of men.

These revolutions of the terrestrial surface, do not take place suddenly, and universally, at once. They commenced partially and demand great and unascertained limits of time for their consummation. And since they have been in progress from the infancy of the world, and their action has never intermitted, we must conclude, the vital economy is constitutionally fitted to bear the vicissitudes their causes occasion; and all the loss of life, it has ever sustained, has been through mechanical violence, such as the sudden sinking of the earth, inundations.

In consequence of the diversity of its mechanical and chemical constitutions, or the universal conformation of

* Revolutions of the Earth's Surface and Geology.

organization and its properties, the earth is presented to the great living families, as so many regions, that limit the geographical spaces, they can occupy. If we were to suppose the whole of one of these regions, which De Candoll* properly calls "*Foci of creation*," containing every individual of any particular race, were destroyed at once by these causes of change; then we could easily conceive of the entire loss of genera and species. The fossil remains of this race, dug up at some distant future period, would correspond with none of the living families; and would properly be pronounced extinct. If, therefore, the doctrine of lost species, should continue to figure in the world, which it undoubtedly will, until species shall be differently defined and understood, it will likely be maintained upon this manner of destruction.

But except the Noahic flood, the tradition, history of no people, human experience, has never witnessed the destruction of so much country at once. And to conceive such an event possible, would be to suppose these "*Foci of Creation*," in very early times, were contained in limits abundantly smaller, than they are known now to occupy. That such destruction may have taken place in great antiquity, is both possible and probable from the fact, that then the races on land, had not expanded to the full measure of their existence, and filled up these foci. In the evolutions of generations and multiplication of species, even amid the greatest abundance of the *alimentaria*, we may suppose a considerable length of time must have been consumed, in reaching their utmost geographical limits. And, if Mr. Whitehurst's† theory of the insular formation of the primitive, terrestrial surface, be true, these limits or these foci themselves, were much more contracted in the ancient, than in the modern annals.

* Geog. des Plantes.

† Inquiry into the Original State and Formation of the Earth.

If we examine the molicular attractions, by which the earth's face is perpetually changed and renewed, like that of astronomy, we shall find them equable and uniform in their operations. They have continued through all periods the same. The same attractions, repulsions continue between the same class of bases. The crystalline forms of all chemical bodies, they evolve at the present time, correspond exactly with those of the same descriptions of all former times. They have precisely the same constitutions, the same number of angles;—are the same geometrical figures. Thus matter, both in its astronomical and chemical constitutions, properties and relations, has descended through all durations unchanged; and the life, it was calculated to nourish at any one period, *cæteris paribus*, it would nourish at another.

But still we may think, we know not matter, nor all the relations, which exist between it and life, as propelling cause and effect. Since the implantation of life in our planet, there are witnesses, that there has been a continued progression. Examination of its paleontology, imperfect as are the means, and actual zoology, shows it has entirely changed all its forms; undergone new developments; and tends continually to new organic modifications. These changes appear to constitute the steady course of nature. The material causes—habitudes—must, as we shall hereafter illustrate, have corresponded to these changes. We know not matter in the essence of its revolutionary powers. Could we compare the progress of life and zoography of Venus, Jupiter,—with ours, new light might be evolved. But our means with our mental forces are limited. We can only see, judge and speak of things according to our little make—the diminutive boundaries absolutely prescribed to our sciences. We would see by the pure light of nature, make perpetual progress towards the Divinity, from whom we have come; and purge,—quit this light of the *Camera Obscura*, which

sheds so many rays on the temples of our knowledge. But we have our place assigned in the universe, are advancing; and, like other beings, must wait patiently for our *revolution*—for the eternal *transmutation*—*metamorphosis*—of our nature.

We conclude finally, if the old races die out from material changes, and are lost to their economy, they are lost alone through the mechanical action of matter, in the subversion of their focal countries;—that they have achieved the end of their being in nature;—and if fresh ranks of life, by transmutation, creation or the *amorphous ova* suggested by us, are gradually and occasionally substituted to fill their place, we cannot profound the immensity, end or use of creation. He is thrice happy,—

—Qui protuit rerum cognosceve causas,
Atque metus omnes et inexorabile fatum
Subjecit pedibus, strepitumque Acherontis avari!
—Illum non populi fasces, non purpura regum
Flexit.—

SPONTANEOUS GENERATION.—Since all life at first was by divine creation and institution; and organization—the universal mode—is foreign to the achievement of the material properties; since, consequently, all life subsequent to the first pairs, has been transmitted by parents, or in the words of the illustrious Harvey, “*Ex ovo omnia*,” *spontaneous* or *equivocal* generation, is an idle question.

Diodorus Siculus and other old writers, mention, that the ancient philosophers of Egypt, India,—maintained, all vitality sprung originally from heat and moisture. But these philosophers lived in the infancy of learning, when experience had only began to lisp the first, simple lessons from truth. Some sages still teach that animalcular vitality is spontaneous. But all life with them, for the most part, is only the simple combination of forces, movements:—the evolution of some occult, material properties. Their conception is extremely vague and indefinite.

SECTION II.

INDIVIDUAL LIFE.

For all the living forms, generation is the starting, death, the terminating point. Their passage from the one to the other of these points, constitutes ages. The organizing force or special forces of life, if not interrupted by accidental causes, will conduct each through this measured distance. But beyond they cannot progress; they will suspend their action.

To our eyes there appears to be superfluous room in nature. We cannot tell by what inflexible necessity, this certain space is given, in which can only burn the precious, divine fire of life, which all beings love, when they have once tasted, but tasting are compelled to quit forever. Is to live the greatest privilege, the highest honor in nature? Is it an approach to the Divinity, an imitation of him? is it a gift too high, too valuable, to be trusted long with creatures of our terrestrial mould? And when we have once lived, do we, forever, remain nearer and occupy new relations with Him. To live for the meanest insect, for all, is to sip out of the cup which angels drink. Is the smallest portion the best for our being's frame-work? and is death, so abundant, our better fortune? We come from oblivion and return; and what we are, is cause for gratitude. Our planet without ours, without any of its lives, one vast and frightful solitude, would roll in space, and enjoy itself in its system. We are doing nothing for the maintenance of the universe; constitute only a single speck; have our place in the immensity of animated existence; breathe as we are breathed; turn on the great wheel of ages; receive the impulse to action with all material being, from an eternal, central Mover, sovereignly active, free, independent.

The durability of these special forces, which impel through the space of life allotted, varies extremely. In some of the more minute, animal forms, in which a solitary, sexual intercourse, suffices for the reproduction of several, successive generations, it is probable, they exhaust and give place to death in a few short hours. While among some of the most colossal of the vegetable races, as the mountain oak, they keep up their action for most twenty centuries. But there is a limit, they cannot pass.

The bases of vegetables being fewer than those of animals, they approach nearer the mineral state. In their alimentation, they decompose carbonic acid and water; *unburn*, as I may say, the bodies, they assimilate. Their vital chemistry is less complex. To this circumstance and the greater simplicity of their elements, is probably due their greater average longevity.

The assimilation of animals is a true combustion. Since they organize a greater variety of elements, the chemical forces in them must offer a greater opposition to the force of organic combination. Hence the continual tendency of their living molecules to rebel and escape; they are subjected to a greater variety of morbid vicissitudes, and more accidental mortality.

We may, therefore, suppose at the summit of the actual scale, life has reached the greatest perfection, of which the present constitution of matter is susceptible, or will allow:—And that if it were possible to form a living creature of a greater number of chemical bodies or elements, it could not be sustained; and life and death would be brought in perfect approximation.

We cannot, however, profound what measures out, and defines the living space. It varies, as we have seen, throughout the zoological series. Every individual passed through the different phases of its being, dies. All came from the dust and return. No animated being,

yet, in all its ages, has ever enjoyed a moment's repose. The force, that impels it on to dissolution, never ceases action. It can never be said of this force, as it can of the bodies, it vivifies:

“Nox erat, et placidum carpebant fessa soporem
Corpora per terras, sylvæque et sæva quierant
Aequora: quum medio volvuntur sidera lapsu
Quum tacet omnis ager: pecudes, pictæque volucres,
Quæque lacus late liquidos, quæque aspera dumis
Rura tenent somno positæ sub nocte silenti
Lenibant curas, et corda oblita laborem:

Nature never softens her movements, smoothenes out the wrinkles of things to charm, secure its slumbers, and reanimate its vigor. Always vigilant, active, it cannot sleep. It permits no tarrying on the sacred ground, it traverses. Mortals should suspect, there is something inconceivably momentous at the end of the course, through which they are so constantly and rapidly hurried; and look on Heaven alone, as worthy of all ambition. Death is the only couch, on which all the living rest. They are carried on by a ceaseless motion, till they plunge its frightful abyss. But the immortal fire, which animates them, does not quench, is not extinguished. It darts forward through ceaseless generations, the fervid breath of the Almighty, imperishable.

But matter is only the common, subordinate material of life: let us elevate our conception to the First Being, the most sublime, incomprehensible, of whose will all lives are but the simple, varied expressions.

CHAPTER II.

THE ORIGINAL BEING—GOD—DIVINE CREATOR.

IF the life, he has set up here, which appears to constitute the top, and the frieze-work of our terrestrial edifice, over whose general aspects, we have just glanced, continues to be an impenetrable mystery, about Him hang shades still more heavy and voluminous. His great idea soars beyond all the limits, by which we are accustomed to define things, and render them tangible to our understandings. Milton philosophic made his throne dark, purely from his excessive radiance. If light too intense overpowers the visual, a conception so unwieldy, subdues equally in proportion, the mental force in us.

Our thought full of industry and enterprise, delights to wander, where matter furnishes the pathway. Early it discovered many of the great, unalterable principles of the sciences, and produced a perfect demonstration of a vast number of their most abstruse and difficult truths.

It did not plant the feet of these sciences alone on the earth. It subjected the celestial bodies to calculation, and prescribed the laws for the regulation of their economy. Not mean, low, in its ambition, it took nature for its field—inheritance—and, for the exploration, possession, relied solely on its own powers and resources. The vast abundance, variety and perfection of its labors have become its eternal eulogia and monuments.

It did not fear to pass over those deep gulfs in space, which lie between and intercept the celestial spheres. It was cheerful and easy wherever it could behold those wandering fires above, which of old, the harmonious Orpheus sang. But outside, beyond, where commence

those wilds, which sweep out lonely and shadowy to infinity: where nought is visible but the empty prints of Jehovah's footsteps; sacred haunts, holy solitudes! where only spirit pure from matter, and the Being of all beings dwell; conscious now of the presence and near approach, the idea grows too full, too strong; its courage fails, and it shudders out, "The hills saw thee, and fled." "At thy coming forth from Teman, pestilence and burning coals went before thee."—"The mountains saw thee, and trembled. By thy naked bow the earth was cleft:—The deep roared out and lifted up his mighty billows.—The sun and moon, 'at thy sight,' stood still in their habitation: but at the light of thine arrows, and the shining of thy glittering spear, they went away."

All created existences fear and do him homage. They know him august, invincible. Tempests, thunder, lightning, earthquakes, hailstones,—some terrific movement—announce his approach. The sun and moon discover him coming, and stop in their habitation, lest they should be seen. But at the sight of his fearful armour, they escape from him. They seem to be familiar with the effects of his anger and dread it; as if they had witnessed the earth cleft by his bow; and heard the pained ocean wounded, roar out, and toss up "his mighty billows."

But when it is a feeble mortal he is approaching, to communicate his special will, still some fearful enunciations make known his coming. The strength of the breath, he has placed in his nostrils appears to be measured; and it is only "*a still small* 'supportable,' voice," that manifests the actual presence. Thus in the first book of Kings, it was said to the prophet Elijah;—"Go forth, and stand upon the mount before the Lord. And behold, the Lord passed by, and a great and strong wind rent the mountains, and brake in pieces the rocks before the Lord; but the Lord was not in the wind: and after

the wind an earthquake; but the Lord was not in the earthquake: and after the earthquake a fire; but the Lord was not in the fire: and after the fire a *still small voice*."

How sublime and incomprehensible he appears in the operations, by which he brought forth and established the existing system of things: "He stretcheth out the North over the empty space, and hangeth the earth upon nothing. He has measured the waters in the hollow of his hand."—"The nations are as the drop of the bucket, and are counted as the small dust of the balance."—"He taketh up the isles as a very little thing."

Language, by which we express every thing, by which we think, strained to its utmost strength, appears most puny and powerless, in its efforts to represent this great idea of all other ideas. Stimulated by inspiration, it clothes the great forms of matter with flesh and blood, perception and sentiment. They live and feel before him. Is he angry, the sun and moon go away; pleased the little hills clap their hands with joy. What, then, ought the true intelligence of mortals do; intelligence without metonymy! And if man, the noise of whose war shakes the earth, the splendor and glory of whose rule, can found and make the wisest heads giddy;—man, who, in his science, has subdued nature, and rendered her forces subservient to his will; whose labor and achievements command our profoundest admiration; be but "as the drop of the bucket, or the small dust of the balance," what is Jehovah!

The distance between our utmost, most successful conception, and the reality must ever be infinite. We only think through the intervention of organization—perceive as our senses are affected, learn from experience, meditate, and build our philosophy on our sensations. A certain order holds between these sensations and the objects which excite them, the order of *antecedence* and *sequence*,

or of cause and effect. Did he immediately excite these sensations, as Malebranche supposed we could directly perceive him; but it is only the objects, he has made, of which ourselves are a part, that excite them.

For these objects we infer another and a higher order in which they stand in the same relation to a First, and Eternal Antecedence, as our sensations do to them. We, then, perceive him only indirectly through these objects, which constitute the basis of all the experimental sciences, himself not experimental. Living amid the fluctuations of our world, breathing only on the tombs of perished existence, we cannot elevate our thoughts experimentally to the first Being, whose ideas, according to Plato and Pythagoras, constituted the beauty and fulness of nature. We cannot understand the eternal reason, truth and nature of things, and the denomination the most appropriate to our measure of intelligence is the *Great Incomprehensible*.

That his full idea soars infinitely beyond us, is manifest from the religion of all antiquity. How varied are the moral character, qualities and abilities of the Gods, who have enjoyed the worship of men! In general, we may say, the taste of the people, the amount of knowledge and civilization, have modified, constituted the standard of their perfection, in the countries, where they have reigned. Climate too all powerful in modifying man, has exerted its influence on them. The Gods of the North, have been fierce and sanguinary;*—obstreperous as the

* The most ancient Woden or Odin, is represented in the Runic Mythology as holding a drawn sword! Thunderbolts encircle his brow. He is the "Father of slaughter," "the active, roaring Deity." His fame—greatness of his exploits—expands to the burning world, and ladens "the vessel, which floats on the ages" or the earth. His chief delight is in battle, "the bath of blood." The Ruler of the Gods and the Father of men, he receives those only as his children into Valhall or Midgard, the city of friendship, who die valiantly, fighting with sword in hand.

In this delightful city, whose roofs are of flaming gold, Nymphs of

blasts from the icy seas, which howl through their country:—while those of the South, have been mild and pa-

unfading beauty, whose bosoms glow with chaste, burning love, attend and hand them the sparkling wine in goblets of their enemies' skulls.

The vitality of the religion of this God is war. "Let the blue steel be dyed in blood," say the sacred songs of the Voluspa; "let the wolf lap the streaming gore; the screaming vulture have his prey to-day." "We fought with our swords, when in my early youth, I went toward the east to prepare a bloody prey for the ravenous wolves." "We fought with our swords, and made the feast of the yellow-footed eagle." "A dew of blood distilled from our swords. The arrows which flew in search of the helmets, bellowed through the air. The pleasure of that day was equal to that of clasping a fair virgin in my arms. We fought with swords in the Flemings' land.—There the sword bit the polished helmet.—The blue steel all reeking with blood, fell at length upon the golden mail. Many a virgin bewailed the slaughter of that morning.

"We fought with our swords in the isles of the south.—There died many of my valiant warriors. In the shower of arms Rogvaldur fell.—In the play of arms came the deadly spear: his lofty crest was dyed with gore. The birds of prey bewailed his fall: They lost him that prepared them banquets."

The Edda and Voluspa or the most ancient Edda, are full of these martial poems. They teach war as the first, the noblest occupation of men; and that valor alone secures the happiness of another life.

The worship of Odin or the religion of the Edda, was that of the ancient Germans, Cimbri, Icelanders, Celts, Danes, Swedes, Norwegians, Scandinavians,—most all the north of Europe and Asia. It was the religion of the people, who crushed the Roman empire; and fixed the fate of modern, civilized nations. Many words in our language, especially the names of the days of our week, evince it was the religion of our ancestors,—as Wednesday, day of Woden or Odin; Thursday, day of Thor, son of Odin; Friday, from Freja or Freya, the hyperborean Venus.

The great pleasure of the furious Odin was the clashing of shields, and the uproar of blood. How striking is the contrast between him and Osiris, a southern divinity. Osiris leaves his wife Isis, and the flowery leafy fields of Egypt, where Zephyrus flutters softly on his purple wings, diffusing fresh fragrance; and sets out for the conquest of the world. His only weapon is a soft-toned lute; beautiful Nymphs and dancing Satyrs attend him on the expedition. He overruns Æthiopia, Africa, Asia, and a part of Europe. He teaches the nations agriculture, the useful arts, builds cities, originates commerce, imparts a taste for know-

cific, devoted to ease and pleasure. In the Temperate Zone, they have been most noble, where man has been most perfect and elegant.

SECTION I.

EFFORTS AND LIMITS OF REASON.

WE only feel, think, as I have said, through the living organism. This organism by its own, solitary movements or operations, does not generate perceptions of external objects. These perceptions are the effects of impressions, made by such objects, on the external senses. All external existences are, therefore, active in the causation of our ideas of them, the senses being incapable of self-excitement. The encephalon is the immediate organ of the perceptions, or medium through which the mind enjoys them. All perception depends upon the original excitement of the senses; the senses themselves material, corporeal objects alone appear to be their true stimulators. It is through the materiality of the body, the mind enjoys intercourse with the universe, and obtains the primordeial elements, upon which afterwards its reason operates.

Impressions, then, made on the senses, and the consequent excitement of the encephalon, in our economy, are the inflexible conditions, through which the mind displays all its activity, and enjoys its life in nature. M. de la Romiguiere conceives the mind passive in re-

ledge, and establishes morals and the worship of the Gods. He achieves by the power of harmonious numbers, what Odin does with the shining steel. (Vid. M. Mallet's Northern Antiquities containing the Edda and Voluspa; Taciti Historia Germani; P. E. Jablonski Pantheon Ægyptiorum; M. l'Abbé Pluche, Histoire du Ciel; Bryant's New System or an Analysis of Ancient Mythology, for much interesting discussion on this subject.

ceiving impressions, but essentially active in the perception of them. This fact, admitted now by so many philosophers, does not, however, militate against the general truth expressed here. The impressions always antecede the mind's action, and if they were not offered, we cannot tell in what state it might remain.

All the beings of nature, I have said, persevere in continual excitement, progress existence by the efforts they make. Our being appears so organically arranged, as to receive the impulse, which causes impressions, from these efforts. They excite in us a double motion; constitute the source whence our pulsating life derives all its activity, and our mind its perceptions.

Our organization is only a simple element in the great mechanics of nature, through which we are subjected to the universal laws, and made to respond to her general movement. Upon this view of the subject, if a mind like ours, were placed in the midst of the universe, with an organization irrespondent to these laws—unimpressible by this movement—it could neither know its own existence, nor that of any other.—Since the organic system does not respond to a spiritual, but only to a material world, it cannot perceive any nature or being not material. And if such a mind, with an organization impressible, full of reaction, were transplanted into a purely *spiritual creation*, it would remain for ever inactive, since such existences would be incapable of exciting those organic changes, indispensable to the display of its faculties, or to which their activity is subordinate.

The mind, therefore, in its simple operations, or those connected with the more complex action of the organic structure, could never reach the idea of an eternal Existence, or sovereign, independent Mind, separate, original, distinct from matter. But can it, in its higher and more complicated movements—those of reason?

According to MM. Condillac and Destutt-Tracy, reasoning consists in different acts of sensibility; or in remember-

ing, comparing and perceiving the different relations between our sensations or ideas. It is the evaluation and co-ordination of our ideas in relation to things. Our sensations and their external exciting causes, are indissolubly connected in our mind. The agreements or disagreements, we feel to exist between our sensations, we intuitively infer to exist between the causes which excited them. Thus the mind armed with the discernment of the difference of things inferred from the agreements or disagreements of its sensations;—or what is the same thing, animated with the discernment of their immutable relations and proportions, it acquires a new force; passes the limits of matter, and rushes forward on spiritual ground, to embrace the world's Divinity.

But the delusion vanishes. It is only the relations and proportions within the empire of the senses, it has discovered; in which exists an eternal *vacuum*, which can only be filled up by admitting such a Being. He exists necessarily; and it is more the place he occupies, than himself, that is manifest.

The mind in this process of reason, therefore, feels, knows Him only the first Relation, Proportion, Unit, Cause, whence have emanated all those series of causes, things with their phenomena, which constitute nature.

But by what manipulation of ideas, if I may so say, does the mind arrive at the knowledge of his moral and intellectual qualities or nature? Are the universal harmony and order, which prevail, the infallible adaptation of means to the achievement of ends; the general fitness, efficiency of things—the world's system—competent to instruct us? If we suppose all the finished labours of the omnipotent Creator, lay before us; and we could comprehend all their high bearings and meanings, it is evident, we could not, even then, be certain of our knowledge. Since it is unphilosophical to think Him inactive, the fresh displays of creative power, to all future eternity, must continually be evolving new instruction, and presenting his nature, in novel and more glorious light. His knowledge must be for ever pro-

gressive. Our researches into the phenomena of existing nature, promptly find their limits.

We know something of the earth's crust, of our domestic stars; but what do we know of transplanetary matter? of those heavens beyond the alternations of our seasons, sprinkling the exhausting telescope with burning specks!—where the last blue skirt of space, hangs out to receive the last glittering form of matter! Here reason can hope for no triumph; its efforts are nothing.

Again: could we profound the system of the world, another perplexing difficulty would occur.—*Can we trace the image, copy of the Divine Artist in his works?*

Contemplating human osteology, Galen, struck with so much design and sagacity, it is said, was convinced, and converted to Christianity. It is thought the mother-ideas of many of our inventions were derived, at first, from nature, as the motion on hinges, etc., from the action of the *atlas* on the *vertebra dentata*. Astronomers observe, the position of the lunar orbit in relation to that of the earth's—her course in the ecliptic—is such, as to occasion the fewest possible number of solar and lunar eclipses; or that any alteration would cause these eclipses to be more frequent.

Wherever we can explore, profound nature dynamical, we meet with this sagacity of Galen, with the boundless, most consummate action of intelligence. Indeed, this intelligence often holds up the flambeau to theory, and alone conducts exhausted science further on the career of nature, procuring for it fresh triumphs. Thus man by the first light that shone on things, is often enabled to trace their true philosophy; as when Newton saw in water an inflammable principle, long before Lavoisier evolved its hydrogen base.

The displays of wisdom, design,—in the mechanism of the world, are the same in quality, which we observe in the ingenious works of human art. If, therefore, with Dr. Paley* and other theologians like him, we make this wis-

* Natural Theology.

dom participate in the Divine Nature, or what is the same thing, from this wisdom infer Him to be wise, we make *our wisdom* or *our minds* a part of his substance, which is Platonism. I think it will be discovered theologians are in error, in making such inference; and that they transcend the proper limits of reason, or make of it an improper application.

The art, skill, foresight, intelligence, wisdom, manifest in the universe, stand evidently, in the same relation to the supreme Opifex, as do ourselves, and all other created existences. Instead of being parts or constituent of his nature, they are only parts of things, he has made; or the manner in which they exist, and obey his sovereign will. To attribute to Him benevolence, goodness, knowledge, intelligence, because they are evidenced in the formation and mechanics of the world, is, obviously, to draw his likeness, nature setting for the picture. If we attribute to him wisdom, goodness, because we observe these qualities in nature; we likewise observe matter, and for the same reason, ought to attribute to him *materiality*. This materiality, which gives to the universe its visible, tangible form, universal base of all worlds, that pour through all space and time, floods of radiant glory, impresses us most. The benevolence, fitness, design,—manifested in nature, are the offspring of much study and reflection. We only know them after we have thought. But matter overpowering our vision in the solar blaze; in myriads of chaste and resplendent forms, thronging the arc of night, strike and charm, at once, our senses.

Do not our theologians, pursuing this argument, incautiously follow the light of Revelation, which they mistake for the light of reason?

In the double extension of time and space, we can trace no limits to the world. To our observation, it is every where boundless. The power, which originated, holds together its vast body; established its equable laws, and maintains forever their operation, transcends all comprehen-

sion. The dynamical adaptation and arrangement of its parts, bringing forth imperturbable order, demanded knowledge perfectly inconceivable. The organization of innumerable lives,—noble *appanage* of our star, and probably of all others,—the general beauty and excellence of their forms; the arrangements, provisions made for their comfort and enjoyment, could only have originated in a benevolence and goodness, to which we can ascribe no boundaries. And matter, precious, common base of all physical existence, whose stupendous, noble forms wander and glitter in the deep abyss of heaven above us, subdues all our thought in its immensity.

Reason, therefore, delineating the first Cause from the qualities and properties—phenomena—of the things He has made, can only conceive of Him, as *infinite, omnipotent, all-wise, surpassing investigation, infinitely good, benevolent, eternal and material*.

Thus in the absence of Revelation, reason, the sole guide, the early philosophers were unable to extend their researches into the origin of the world beyond the existence of matter. In studying its phenomena, Parmenides, Aristotle, Democritus, Pliny, Lucretius, the atomic and Italic sect of philosophers,* felt those awful and sublime qualities, which appertain to the Divinity; but they could not think of a pure eternal mind, as their subject. They thought right on, followed up reason, made no personifications of the sentiments they felt, and terminated all their inquiries and meditations in making matter eternal, and the attributes of a Creator, eternal in matter. They have run the gauntlet of generations, covered with the odium of Atheism. But they lived mostly while it was still dark.

All the first Gods pagans worshipped, were created by poetry or disfigured by its transforming light; and, without exception, *material*. So far as it can be trusted or will go, the etymology of their names show, they were the deifications of illustrious men, of fire, light, the sun or some of the celes-

* Wait's Jewish, Orient. and Class. Antiquities.

tial bodies. Hesiod styles his treatise concerning them, or the fragments of it, time has honoured, *theogony, the generation and birth of the Gods*. The title of his work evinces his opinion of them. Furthermore, there can exist no doubt, but the theogony of Hesiod is the cosmogony of Plato; a judgment approved by Cudworth,* and a plain proof, that the birth of the Gods was no other, than the birth of nature, and consequently, they were material.

All their desires, acts of their lives, evince their sensitive, corporeal nature. How fierce and impetuous, if I may so express it, were the flesh and blood of the Olympic Jupiter! When the great Ocean was thrice churned up from the bottom, and its waves covered the whole world, the Indian Vishnu, in the judgment of Sir W. Jones, one of the triple forms of Brahma, was compelled to change himself into a fish to save his own life.† He was fearful of death.

If, therefore, their physical properties and qualities have been derived, copied from those of nature, their moral character plainly recognizes for its prototype, our humanity. This character but too evidently manifests its frailty, folly and insanity; and like language does among different people, marks the progress of arts, sciences, improvement among the different nations, who offered them worship. With respect to these divinities, the remarkable expression of Diderot is true, "Man hath made God after his own image." The biography, rather theograpy of Jupiter, whose superb temples were once the glory and ornament of almost every country on earth, many of which still "frown in ruins," drawn to the truth and the life, would shame all justice, virtue, modesty; be at once a history of disgraceful amours, atrocities; of actions the most noble and sublime, qualities the most awful and reverential.

We conclude finally, the true and full image of the Supreme Being, cannot be copied from the substantial frame and mechanics of the world; while "the invisible things of him—are clearly seen," and "understood;" and that his

* Intellectual System of the Universe.

† Dubois' India.

natural wisdom, foresight,—mentioned by the sacred writers, like many other things, are to be understood philosophically, as *anthropomorphitisms*.

SECTION II.

REVELATION THE SOURCE OF ALL TRUE THEOGNOSY.

WE may suppose, man came forth in the earth, instructed in the knowledge of his Creator, of the duties and obligations, he owed to him :—That this sacred, precious knowledge, was taught to the patriarchal families ; was preserved through the transition of generations ; and, in the household of Noah, survived the universal cataclysm, which destroyed the balance of the race.

It is entirely certain, the notion of a distinct, superintending, all-powerful mind, at a very early annal of history, did exist almost over the whole face of the world ; and can be traced, with a good degree of surety, to near the time of Noah, the second father of human kind. Deformed by time, disfigured by fable, vestiges of this awful and sublime idea, are to be found in the Edda, the Voluspa, of the North ; the Shuking, the Pruranas, Vedas, Zendavesta, of China, India, Persia. All these curious and sacred monuments of antiquity, containing the oldest traditions, histories in the world, have likewise plain allusions to the creation ! an universal deluge by water ; and most if not all of them, to another, by fire, which will end in the final destruction of the world.*

* “Of the flesh of the Giant Ymir,” says the Edda, “was formed the earth ; of his sweat, the seas ; of his bones, the mountains ; of his teeth, the rocks ; of his hair, the herbs of the field ; of his skull, the heavens ; and of his brains, the noxious clouds.”

“The sons of Bore,” continues the same record, “slew the Giant Ymir, ‘figure of the earth,’ and there ran so much blood from his wounds, that all the families of the giants of the frost were drowned in it, except one single giant, who saved himself with his household. He is called *Bergelmer*. He escaped by happening to be aboard in his bark.” By him was preserved

By whatever name this universal, sovereign Mind was called, whether Oromasdes, Serapis, Kneph, Osiris, Pan, Iao, Jehovah, Jupiter, Tai-ki, Tshangti, it is certain such a mind received the homage of men from the Oases of Egypt to the furthest limits of Iceland; from the eastern shores of China, to the foot of Caucasus.

The records of all antiquity show, the first religion of men was universal; that idolatry and other corruptions were introduced after the fathers of nations had scattered abroad, and their generations had peopled different and remote countries. Among all the Gods to whom the fecundity of their minds had given birth, they still retained the remembrance of the Supreme Numen of their fathers, and of his ancient creation of the world. These remembrances are to be found in countries and epochs very distant from one another, showing they had been carefully preserved.

Ovid, who laboriously consulted the traditions of antiquity, acknowledges a supreme Ruler, *Pater Omnipotens*; and evinces in his *Metamorphoseon*, he was acquainted with the fundamental ideas of the Mosaic history of creation.

In nova fert animus mutatas discere formas
Corpora. Dii coëptis—
Aspirate meis: primaque ob origine mundi
Ad mea perpetuum deducite tempore carmen.
Ante mare et tellus, et, quod tegit omnia, cælum,
Unus erat toto Naturæ vultus in orbe,
Quem dixere Chaos; rudis indigestaque moles;
Nec quicquam, nisi pondus iners, congestaque eodem
Non bene junctarum discordia semina rerum,
Nullus adhuc mundo præbebat lumina Titan
—Nec circumfuso pendebat in aere tellus
Ponderibus librata suis.

his race. The Chaldean theogonies, according to Berosus, contain similar ideas.

In the twilight of the gods, Odin puts on his golden helmet, and his resplendent cuirass, preparing for battle with the wolf Fenris. He is devoured by the wolf; when a black conflagration rages through Heaven and earth destroying whatever exists. "The sun is darkened; the earth is overwhelmed in the sea; the shining stars fall from heaven; a vapour mixed with fire rises and a vehement heat prevails to heaven itself."—*Voluspa*.

From the same venerable sources Horace, no doubt, drew the elements of the sublime theology, he so beautifully sings in the 12th Ode of his first book.

Quid prius dicam solitis parentis
 Laudibus, qui res hominum ac Deorum,
 Qui mare et terras, variisque mundum
 Temperat horis?
 Unde nil majus generatur ipso;
 Nec viget quidquam simile aut secundum.

And Virgil, who had studied much what had been written before him, and acquired just notions, makes Venus address him,

O Pater, O hominum Divumque æterna potestas!

It could be shown from innumerable passages, that both the Greek and Latin Poets, among all the Gods they recognized, admitted only one—*zēvs*—or Jupiter—as original, supreme and ruler of the others. The same remark applies equally to ancient Persia, Egypt, India, Arabia, China, Scandinavia.

Contrarily, Mr. Hume,* from his manner of reasoning, is led to believe idolatry was the first religion of mankind. It is true idolatry can be traced to a very early stage of society; and polytheism, pantheism, to the first systematic efforts of reason to account for the origin, order and maintenance of the world. But if idolatry did exist early, it is no proof; since the true religion can be traced to the first ages themselves; and since it is unreasonable to suppose, the first men were turned loose untutored savages to roam the world.

All antiquity presents two modifications of the prevailing theologies—the *learned* and the *vulgar*. Plutarch says, “some of the Gods are unworthy of credit, and not to be believed in.” We may suppose he alludes to those of the illiterate, who could not elevate their conceptions to the object of philosophic worship. Some of the philosophers, struck with the sluggishness of matter, banished from the notion of the Supreme Divinity all corporeal qualities. Those

* Dissertation on the Natural History of Religion.

uninitiated in the mysteries of learning, were not capable of such sublime abstractions; and the philosophers were not careful to correct the vulgar errors* of the popular religion of their country. The two theologic systems often varied extremely. Those, who have transmitted their history, have not always made the proper distinctions, which has caused posterity much labor and difficulty in forming correct opinions of the worship of ancient people, and been the source of much perplexity, error and disputation.

Notwithstanding, however, the corruptions, which have been introduced by philosophers as well as the illiterate, and the darkness time has shed, the remains of the first pure religion, as I have said, may be traced to most all ancient people. It is manifested in many of their sacred rites and ceremonies; in their knowledge more or less obscure of the creation, early events and accidents of the world. "The higher you ascend in antiquity," says M. Gouget,† "the nearer you approach the first ages after the creation, the more vivid become the traces of the knowledge of the Divine Creator." According to Diogenes Laertius, the cosmogony of Linus, among the oldest of the Greek poets, begins:

"Ἦν τότε τοι χρονος ἕτος ἐν ᾧ ἅμαπαντ ἐπιφύχει,"

showing he had received the tradition of the supernatural origin of things. Dr. Hyde‡ thinks the Persians retained a more expanded knowledge of the first universal religion, than most of other nations. The Brachmans, according to Strabo, believed the world was created, and will be destroyed by God, who governs it. But, by what means did this knowledge become diffused among so many nations?

The immortality of the soul and a ruling Power distinct from nature, were first developed and taught in Egypt and India. Thales, Strabo, Hipparchus—the noble students of Greece,—early resorted to Egypt for instruction. From

* Vid. Leland's Advantage and Necessity of the Christ. Revelation, vol. 1.

† De l'origine des Loix, des Arts, et cet. Tome 2. p. 451.

‡ Hist. vet. Persarum.

the mouths of the priests, the faithful ministers of Kneph, and depositaries of all wisdom, they learned these sublime doctrines, and carried them home to be transplanted in their native country. They were first proclaimed in Greece by Pythagoras and Plato, the illustrious founders of two great schools of philosophy, whose fame will continue, when all the sculptured marble of their country shall have perished. Egypt, where they were taught, whence have been derived so many mother-ideas of the existing sciences, was the country to which Joseph was sold by his wicked, unnatural brethren. By his wisdom and virtues, here Joseph rose to consequence and importance in the royal house of the empire. From the high and popular station, he occupied, he must have enjoyed abundant opportunity of imparting to the Egyptians, the instructions, traditions, he had received from his pious father.

When the Assyrian monarchy began to expand its power, and assert its right over the conscience, Abraham, to preserve his religion pure, emigrated to the West, and ultimately into Egypt with his posterity. Here, it is said, he taught the true theology, and some of the useful sciences.

It was likewise the country of Moses, who, like Cyrus and Romulus, was exposed in infancy, but unlike them in the power he trusted, became the instrument of Heaven for the delivery of his oppressed nation; and for the establishment of "a kingdom, which should have no end." Divinely inspired, he taught the people the true worship. Egypt, associated with so many early recollections of our religion, has become indissolubly connected with its history.

In the explosion of our race from the foot of Mount Ararat, and their subsequent emigrations to distant regions, we may suppose, they all carried with them some true notions of God: traditions of the creation, of the deluge, and other remarkable events, vestiges of which are to be found in the Voluspa, the Shu-king,—all the venerable monuments, I have cited. The light too afforded by some researches*

* History of the European Languages. A. Murray.

recently made, to trace the path of these emigrations, and the consanguinity of nations, by the history and affiliation of languages, altogether favour this view of the subject.

We know the Persian monarchy overthrew the Assyrian empire, liberated the captive Jews, from whom the Persians may have brought back ideas of the true religion into their own country. The Greeks afterwards conquered the Persians. Since vestiges of this religion are to be found in Persia, they no doubt obtained some notions of it from them, as well as from the schools of Egypt. Historians assure us, many new and improved theological principles spread throughout all Greece, after the return of Alexander's army from the conquest of the East, which confirms this view of the subject. Strabo and Longinus were acquainted with the writings of Moses; the one admired the wisdom of his laws, the other, the beauty and sublimity of his style. And we are certain, whatever the Greeks knew, the Romans learned.

If, then, the Greeks, who visited foreign people, collected the knowledge, wisdom, traditions of the world; made their literature the focus which since has radiated all ages with the light which was, learned some correct notions of the eternal, sovereign Mind from the priests of Memphis,—sages of Egypt,—these priests and sages, themselves, had enjoyed the instructions of Joseph, Moses, Abraham.—Besides, still earlier, these teachers of the Greeks may have derived some traditions from Cham or Sham, who, it is conjectured by many of the learned, built in the Oases of their country, the temple of Jupiter-Ammon, or temple of Jupiter erected by Cham, son or grandson of Noah. And if *Jupiter* or *Jove*, as many believe, is derived from *Jehovah*, by dropping the Hebrew aspirates or pronunciation, then this temple was built in honour of Jehovah by the descendant of Noah, and his worship established.

And if in the Edda, the Voluspa,—the most ancient records of China, India, etc., vestiges of the true theology are to be found, all corresponding in their general bearing

and character, they must have been carried to the North, the South, and the East from the country of Noah, the common focus, whence all nations went forth.

Thus, finally, we trace the idea and belief of an all-powerful, immaterial sovereign Mind—an eternal, spiritual Creator, which, under different names and disguises, have prevailed among all mankind, to REVELATION, as the true, primeval origin; and establish, that such conceptions are beyond the loftiest flights, the efforts of the most sublime reason.—Revelation! medium of communication, which unites us eternally with the Divinity.—Beautiful, everlasting mirror! in which we behold his will, the object, end of our being.—Eternity made visible!—ourselves understood!!

Twice this beautiful idea of revealed religion, was dying away upon the world; twice it has been riveted upon the hearts of men; first by Moses, lastly, by our blessed Saviour—in his life—in his tragedy of Mount Calvary.

Revelation! *beautiful star!* that lights the footsteps of the forlorn, long-lost children of a Father, to the paternal, celestial home!

We have collected rapidly the notion of the first Being, from whom all others have descended:—to whom appertains whatever is included in *Maximus, Optimus, Imperator*:—Who is *before* and *after*, *above* and *below*; *encircles* by his presence the *το παν*, *what is*, but is not *encircled*; imparts *life* and *being*, but receives *none*; *moves*, but is not *moved*; *communicates* his knowledge, but cannot be *known*.

Let us contemplate matter in its system, first condition, universal base, as I have said, of all vitality.

CHAPTER III.

THE MATERIAL SYSTEM—NASCENT LIFE.

INDEPENDENTLY or beyond our sensations, we know not matter. These sensations being the sequences or effects in our living organism, caused by its action—or changes in us—which the mind perceives, we can only know it as their cause. A sensation being simply a material movement, impressed upon our sensitive structure, and perceived; and the sensations being extremely various, we must conclude, matter is endowed with an almost infinite diversity of active properties. This conclusion is fully confirmed by the fact, that in all the sciences, which experimentally consider it, a host of phenomena constantly occurs, to which, the most sagacious philosophers can assign no laws or reasons. These phenomena are the expressions of its active powers, which have continued to mock all human discernment. And, although experimental physics, occasionally obtains signal triumphs; fritters away a little darkness here and there, encouraging the mind on in an eternal career of discovery; yet we may suppose, in any limited duration of ages, in any height, to which knowledge can reach, it will still present new phases.

When we consider, that the power of all astronomical motion resides in all space, as in the astral bodies themselves; so that if a new planet were projected within the limits of our system, it would be put in motion by an *omnipresent energy*, it would meet there; or respond to the great solar action—matter retires completely from us, and is covered in the most impenetrable darkness. And when we remember, at the actual time, that philosophers, in the generalization of the facts of our knowledge, are inclined to regard the molecular attractions, the imponderable or polar forces, only as modi-

fications of the great cause of the siderial movements, we may suspect, much of what we know is not entirely certain; may hereafter admit of very different explanations; and science will still have often yet to retrace her footsteps, and set out on new routes.

SECTION I.

ORIGIN—HISTORY.

THE sacred writings, all early traditions, announce an incipient stage, chaos of the nascent world. Then were darkness and confusion. Nature was without life; her aspect, fermenting, bubbling seas, rolling amid loud, muttering thunder. The hours had not come forth; Aurora appeared with her amber-coloured locks; nor had the Seasons linked their rosy hands.

The fiat of the all-powerful Mind went forth, or as in the Vulgate, *Et Spiritus Dei ferebatur super aquas*. By a regular and successive series of operations, the different forms of the world were fashioned, and combined into a harmonious system of reciprocal action, which has continued since, the enduring monument of its Maker's wisdom and power.

Anxious about the past as the future, the human mind has always evinced an indomitable desire to beat its way up the stream of time to its source, and make itself the familiar spectator of the dramatic creation. It delights to look, and gaze round the cradle of things; and see infant being start from nothing to history. All antiquity abounds in labors of this sort. It has attempted to explore the infancy of things, by two separate routes or methods of reasoning; the one, *a priori*, the other, *a posteriori*.

The first sages, who esteemed the gods every thing,* conceived or shaped the universe upon the models of their grandeur, dignity, and antiquity. Such were the ancient Persians,

* J. Barrett's Inquiry into the Origin of the Constellations.

Indians,* Egyptians, Chaldeans, Chinese, Scythians.—In their fabulous account of the world, they conceived of Eons or revolutions included in vast cycles of time extending back almost infinitely. In these Eons, they afforded room for the displays of the prodigious powers of their Divinities, and set forth their great ages. According to Moshieim,† the Eons were of various orders, both the *partial Creators*, and the *elements* of which the world was composed. I may remark *en passant*, Buffon appears to have derived some brilliant materials from this philosophy of the ancient Gnostics, for his “Epochs of Nature.”

The second method is the reasoning from the facts, or the laws and phenomena of nature. Thus Ptolemy Philadelphus invented his crystalline spheres, and Descartes, his vortices, to unfold the world’s great order and idea. Like beautiful flowers, these two hypotheses bloomed, and were swept away in the tide of time.

Pythagoras was the first, we know, who, emerging from chaos with the world, and operating with mystic numbers, he no doubt learnt from the priests of the Egyptian Hermes, placed the sun in the centre and made the planets move round him. *Primus, hic canit errantem lunam, solisque labores—veritate.*

This idea long buried in the rubbish of antiquity, was revived by Copernicus. The demonstration of its truth, successfully begun by Galileo, Tycho-Brahe, advanced by Kepler,‡ was triumphantly completed by Newton.

Although he completely developed the laws of the siderial movement, he was unable to conceive the first efforts, without supernatural impulsion. Could the cause of these first motions, which never yet for a moment have relaxed their intensity, be shown to be physical, what a triumph to the science!

If, therefore, by the first method, the early sages con-

* Vide Sir I. Newton on the Hindoo Zodiac. W. Jones’ Asiatic Researches.

† Ecclesiastical History, vol. i.

‡ Vide Dr. Brewster’s Life et. cet., of Newton,

ceived the world upon the models of their divinities, and adapted it suitably for their sojourn and government; and if they were the primary principles, that governed in its first conceptions; it is the second method, or the principles of reason, established by Bacon, that reign in our day.

Animated by the conceptions of Whiston and Leibnitz, Buffon, with these principles, which had so successfully conducted Newton, attempted to soar to the *cunabula* of things to deduce the order. A solitary sun lodged in space, and a comet to shiver it by contact, were the first elements. The pieces broken and projected off, would fall under the influence of the double attraction, forming orbits and planets at the same time. An *original, frangible sun, and the interior nutritive moulds of organic bodies* conceived, the ideas of worlds and a *living economy*, were of easy evolution.

Though fancy had seducing, irresistible charms for him, he was great. His mind full, saturated with eloquence, must long glow all over nature with peculiar light and warmth,* frightful to all rivalry.

The numerous systems of cosmology, which preceded

* I may be permitted to subjoin the testimony of M. le Com. de Lacépède, which exhibits those sublime and spiritual sentiments, almost divine, which men indulge toward one another, who feel themselves the oracles, through which other mortals are to hear the voice of nature; and the eyes, through which they are to behold her.

Buffon venoit de mourir. Ce deuxième volume est terminé par un éloge de ce grand homme, ou plutôt par un hymne à sa mémoire, par un dithyrambe éloquent, que l'auteur suppose chanté dans la reunion des naturalistes, "en l'honneur de celui qui a plané au-dessus du globe et de ses âges, qui a vu la terre sortant des eaux, et les abîmes de la mer peuplés d'êtres dont les débris formeront un jour de nouvelles terres; de celui qui a gravé sur un monument plus durable que le bronze les traits augustes du Roi de la création, et qui a assigné aux divers animaux leur forme, leur physionomie, et leur caractère, leur pays et leur nom." Telles sont les expressions pompeuses et magnifiques dans lesquelles s'exhalent les sentimens qui remplissent le cœur de M. de Lacépède. His last expressions, full of the piety of nature and her Creator to his physician, were, "J, vais rejoindre Buffon." Eloge Historique par Cuvier prefixed to the *Histoire Naturelle de l'homme* of M. de Lacépède.

and came immediately after Buffon, like his, contain but little solid instruction. They however have not been without their utility. The research and industry to which they gave origin, the numerous facts they caused to be collected, have all been serviceable in constructing the theory of actual geognosy.

It is in the true knowledge of our planet, we are more immediately and deeply interested, with which our fortunes are closely, directly connected;—our home, theatre, where all our ages have passed. We can never know the stars. Their astronomy only teaches us their relative weight, density, size, distance, figure, statical force, velocity;—a certain routine of facts, which may extend infinitely both ways. It shows us only how nature figures in the abyss of space; and presses warmly upon our hearts with all its burning, roving fires, the great image of her Creator. By no dim traces does it lead us fearfully up to the momentous hour, when those fires begun to empurple the skirts of the eternal night, which preceded. Deaf, it did not hear the hymn of the morning stars, when they shouted for joy. Astronomy knows nothing of progressive existence; and presents nature ever as a modern.

Where shall we seek for the knowledge we desire; where are the monuments, that point to the things, which have been? There are no vestiges, they are not written in the sky. Can time, mowing with his scythe, mow utterance, and nothing remain to tell; has nature, in her long course, preserved no remembrances; “raised no white stone, daughter of the oozy stream, to speak to other years?”

The earth wears a new face; it has had other faces; its bosom is the sacred depository of her records, which have awaited the interpretation of human genius. The interpretation has been made in the current epoch; antiquity can speak.

SECTION II.

HISTORY OF THE EARTH.

INORGANIC or mineral bodies, the products of all countries alike, are strictly native no where. If, therefore, different species of rocks were carried from the tropics, and deposited in the soil of Norway, even if distinguishable, they would indicate nothing certain of their locality to some future geologist, who might examine them. If he were to discover their crystalline forms broken, their surfaces triturated by friction, or they had undergone fusion; these phenomena would indicate to him, there had, at some period, been violent, terrestrial convulsions, rolling waves, and volcanic conflagrations: but there might be nothing to point to the precise time, when these changes occurred.

Contrarily, living, organic bodies have peculiar, characteristic qualities. Their being in nature demands a variety, but a definite minuteness of conditions. They are only producible from one another according to species. If the species be destroyed, the race is extinguished forever. They have special relations to solar heat or to climate;—have an indigenous locality. They likewise have special relations to the different elements or great forms of terrestrial matter, to which their structures coaptate; and have in them also, as I may say, the same indigenous localities. They are *paludal*, *fluvial*, *terrestrial*, *oceanic*. They cannot exist out of these indigenous localities, their separate nativities. They are, I may say, parts strictly of the places, where Nature has placed them to subsist.

If, therefore, they be carried to other places, however remote; in whatever parts of the world they may be found; in whatever situations of the terrestrial surface imbedded; they will point to these nativities, to which their structures coaptate; make known, long as the distinct traces of their forms remain, their countries. They, likewise, betray the

localities, where mineral bodies containing them, have been formed; or whence they have been transported. They make these dumb bodies speak; rekindle the extinguished light on things where gloom, the shades of night had gathered for eternity; remould the forms of perished existence; build up again the horizons of worlds, which had crumbled, fallen in;—articulate history and philosophy to laboring, scrutinizing reason. So that if in these subterraneous rocks of Norway, supposed to have been transferred from the tropics, which can only indicate by their mechanical position, and by the action of the great chemical agents, this geologist were to discover but the prints of the leaves of the palm, the cocoa-nut tree, the anana or pine-apple; they would speak to him with new tongues, and manifest themselves in new relations.

The mineral forms, spontaneous in their reproduction; not descended by an inflexible law from one another of the same species; not limited to any absolute duration; subjected only to changes from the general chemical and mechanical forces; can only indicate the action of these forces; and, by their relative positions, the probable order, in which it occurred. Their manifestations, therefore, are only general; they mark but vaguely the order of progressive existence.

But the organic forms, descended in a perpetual line from one another according to species since creation; subjected to exact periodicity of existence; incapable of existing out of their nativities, and proper inhabitable elements; liable to death by disease, mechanical violence, chemical agencies, atmospheric meteorizations; wearing, as I may say, the name of their country and inhabitable element written on their foreheads, in all their structures, point out by their remains, in a special and definite manner, the changes of the world they have inhabited, and the order of their succession. Every thing about them is precise, special, significative; and the historical instruction they yield, is of the same kind.

Since the living remains entombed in solid rocks, wasted in the beds of the earth, are often in bad preservation, in order to obtain this instruction, it is indispensable to be able to decide with certainty, from a single entire fragment, the precise order of life, to which it belonged. Before, therefore, the *archives*, which nature had preserved, could be read, the separate elements of animation or the great problem, theory of organization which she had practised, the alphabet of life, remained of necessity to be deciphered.

The ancients, who dissected but little, could never have understood this theory—*divine alphabet*—she has employed in recording our world's great history. The triumph, glory of deciphering it, *unequalled before*, were reserved for the current annal.

Our manner of writing forbids us the pleasure of pursuing the torrent of ideas until the light broke. I will only say, to the anatomical labors of Monro, and Blumenbach, of John Hunter, in collecting and fitting up his Cabinet of Natural History, something is due. But Vic d-zér caught the first pure ray of light. In the subordination, general adaptations, and arrangements of the system of life, he obtained a glimpse before his death, of the great organic problem as practised and unfolded by the art of Nature. After him Bichat pushed forward his ideas; opened up vast and new routes, tasted some pure truth; but Death, jealous of Cuvier's fame, the enemy of knowledge, pushed him suddenly from the thinking theatre of Europe, his glory burning after him in the tears of philosophers.

Cuvier and Newton were the most fortunate of men. Had they been born earlier, it would have been too soon for their glory. Often one generation comes in sight of truth, but several are exhausted before they overtake her. At the critical hour of the philosophical world, Cuvier appeared, his genius, the Aurora of a new, perpetual day. He looked, saw what had been done; what remained unfinished; profounded, comprehended the entire plan and meaning of organization.

“Des resultats plus surprenans encore,” says M. Serres,* eloquently, “font le fruit de la loi d’harmonie des parties. La terre renfermedans son sein, les restes d’un monde primitif, submergé par le déluge. A la voix de M. Cuvier tous ces ossemens épars se rassemblent, tous ces fragmens mutilés se reunissent, et nous voyons une science nouvelle, et nous voyons un monde nouveau, sortir, pour ainsi dire, des entrailles de la terre.”

“An animal includes in its economy the idea of a definite design; each natural member is a part of this design, and the different members are the mutual interpreters of one another.” Through the law of harmony, which reigns over animal *morphogeny*, nature spoke to Cuvier. By the single bone of any creature, he was enabled to know the construction of its entire organization, the kind of food, habits, wants, character, local habitation; and distinguish the race to which it belonged. Armed with this knowledge, he was enabled to point out from the debris contained in the strata of the earth’s explorable crust, the different orders of life; mark the distinctions clearly between those of the more ancient secondary formations, and of the ones still more recent; and proclaim, from all antiquity, there have been gradual, and complete changes in the living forms, and a constant progression of life. Each of the strata existed the surface, at different epochs, and belongs to a separate order of the world. The human fossils are only found in the top, or diluvial superface; man, therefore, is a recent comer into our planet, and belongs to the last order.

The existing continents were the floors of the primitive oceans, and the bottoms of our seas, the continents, on which the Antediluvians perished.† Hence their bones have never been found. Lower in different beds, the remains of the Rodentia, Paleotheria, the enormous Pachydermata, Ichthyosauri, Edentata, Ophidia, rest upon the ruins of purely Neptunean life. Still lower in much more distant epochs, all

* Anatomie comparé du cerveau et cet.—tome 1. p. 22.

† Revolutions supra citat.

vestiges of life on land disappear, and show in the first annals, aquatic vitality long held universal possession and sway.

Here, then, is a thread of light, connecting the first and the last moment of time together. And here is the muddy cradle of chaos, the *rerum exordium*; the beginning of history.

Each of the terrestrial strata is an ample theatre, where the crowded population of animated existence, ran on in the torrent of ages, until the seas quitting their ancient beds, and taking possession of the dry land, stopped their career; and made room for the introduction of new lives with new forms.

The history of our planet is the history of rebellious forces, —of revolutions, convulsions, catastrophes, overthrows. Our author, by the light he had kindled, was enabled, with tolerable certainty, to assign the order to these revolutions, and trace through the varied phases of organization the progress of life.

When we consider how much of our positive knowledge depends upon the senses, and with what rapidity death breaks the thread of experienced observation, we should learn to doubt as well as believe. And when we remember that all history is of recent date; its furthest extremity covered in the night of fable; the few truths it contains, colored with the passions, genius of those who composed it, our doubts may increase.

Nature's work was done, her story told, before we were the spectators. The necessary connections and relations of things are the only tongues she has left, to tell us of her history. In the living forms, these relations are numerous, definite and communicative; every single structure preserved, so many rays of light bursting out from antiquity, up through the earth, which covers them. And although by our thought, we cannot dart into the vortex of eternal darkness, down which all her years have plunged with their deeds, and bring them up to the living light, yet from her many voices, —from the flambeaux she has left burning, as so many light-

houses, standing lonely in the horizons of her ruined empires ; —from her innumerable organic remains, as so many ruined stars, beaming mournfully upon us from afar,—we can judge pretty precisely of the labors she has undergone, and of her travelled course,—

Uti magnum per inane coacta,

as sung the great bard of antiquity, whom sea-frowning Rhodope and Ismarus loved,

Semina, terrarumque, animæque, marisque fuissent,
Et liquidi simul ignis: ut his exordia primis
Omnia, et ipse tener mundi concreverit orbis.
Tum durare solum, et discludere Nerea Ponto
Coeperit, et rerum paulatim sumere formas.
Jamque novum ut terræ stupeant lucescere solem,
Altius atque cadant submotis nubibus imbrēs:*

Changes of internal structure; the *bitumenization* of extinct genera and species of vegetables; *situation* of the Coal Measures; the *fossilized Testacea* and other relics of Oceanic life, comprising the mountain limestone; the huge *Saurian* and *Ophidian* tribes, the *Ichthyosauri*, *Plesiosauri*, *Megalosauri*, other amphibia; and those of the *Mastodon*;†

* Bucolica 6, Virgil.

† Bones of most enormous size have been recently discovered in the plains of Florida. They lie just beneath the surface, some of which have been exposed by the washing of torrents and rain-water. The author has seen only a single *dorsal vertebra*. The processes were completely destroyed; and the alveolar texture much developed by the loss of substance. The bone otherwise was entire, the articulating surfaces distinctly visible. My informant says, “in the country they are called old grindstones,” from their resemblance, I suppose.

This vertebra, when new, must have been some ten inches in diameter, and the race of animals to which it belongs, must have become completely extinct, when the diluvian stratum or surface was formed, in which its remains are found. No doubt the fossils of other species will be discovered, when the country shall have been more used and explored.

Those who have regarded Florida as recently formed in the lap of Nereus, by the action of the Gulf Stream, or coral of life, would change their opinion on examination of the actual features of the country. In formation it manifests to be of the same age with Atlantic Georgia to the colline range of

the *Palaeotherium*, *Anoplotherium*, *Megatherium*, and others, struck completely from the living economy, and buried in

the country. And these huge bones may be looked upon as the tombstones of an ancient world or order of nature, which has long since ceased to exist.

Their great size forbids they should have been the relics of any of the known species of the Edentata. It is more probable they belong to some of the extinct *Proboscindiana* of Cuvier;—the *Mastodon giganteus*, *M. angustidens*; or some other unknown, *huge species* of the pachydermatous family.

Human remains of probably great antiquity, and likewise works of human art, which bear no resemblance to those of the aboriginal people, have also been lately discovered in Florida. Col. T. Bailey, a very intelligent gentleman, who resided in that country, says, a monument built of durable materials and in a good state of preservation, stands in a vast plain, round which, at considerable distance, the ground has been levelled and made perfectly smooth. Nothing indicates it to have been constructed for defence against an enemy, or to contain any thing military in its original design. It was most probably constructed to perpetuate the recollection, when some colony arrived, and took possession of the country. The oldest Indian traditions know nothing of its origin.

About one mile south of this ancient monument, flows a clear beautiful stream, continues the Col. A party fishing in this stream, the figure of a man was discovered, lying in about four feet water, below a shoal. It was raised up and found to be part of a human skeleton, in a state of perfect petrification. The parts wanting were the arms and lower extremities. The whole body, neck and head, the *ossa innominata* attached firmly to the spine, remained in one entire piece, and perfect in all their parts to the life. No skeleton prepared by art, could look more natural, except the substance was a smooth, yellowish rock. Petrifications of no other substances were noticed.

If this human petrification were launched into the geological world, no doubt, it would become the rival of the celebrated one of Gaudaloupe, and provoke much speculation. The race to which it belongs, and the authors of this monument, might be reduced to greater probability. Historians speak of foreign people having visited our shores before Columbus. The Honorable S. Grantland presented me a copper coin, lately dug up on his plantation, Lee Co., Georgia, not distant from the site of this Florida monument, which from the situation in which it was found, must have been there for centuries. The words *Pater-Maria-Av.*, were plainly legible on its face. The date was corroded, the number 14 was visible, and some *armorials*. It appeared of great age—and evidently Spanish.

I have just learned, bones much larger than common, and of unusual appearance, have been dug up in the Brunswick canal now in progress. They probably are of some of the lost races of the Edentata.

the *Lias*, *Oolite*, *green sand stone*, and other higher, more recent formations; demand, in our modern geognosy, a long preadamitic epoch for the *maturescent world*.

Since all animation demands certain conditions or constitutions of matter, among which are heat, light, moisture, and vegetables require fewer of these than animals, the essential nature of things does not contradict this idea of *maturescence*, nor is it discountenanced by the Mosaic narration.

SECTION III.

ORIGIN AND PROGRESS OF LIFE.

LIGHT was the first finished form of nature. After the creation of sea and land, on the third day, the earth brought forth grass, herbs, and fruit trees; the simplest forms of vitality, which required the fewest modifications of the chaotic matter for maintenance, breathing the humid firmament, and subsisting on heat and light, not yet concentrated, or fashioned into astronomical form.—For the first three days of time, having transpired before the existence or revolution of any planet, differed from all other days since.

It is said on this day, of which the *evening* and *morning* were the third, “the earth brought forth grass, and herb yielding seed and the tree yielding fruit.” We know not the duration, this process of vegetation consumed, only that the morning and evening of it, constituted the day.

The celestial bodies were placed in the sky, and our astrarchy organized on the fourth day. Time already commenced, now received for its duration a measure, making it intelligible. Fourth day! brilliant epoch of the rising world! riches, incomprehensible fulness, glory of creative power!*

* In contemplating this power man always betrays his weakness. The idea of creation is above the mould of mortal thought. It is the conception of production without materials,—perfectly inconceivable. Thus Whiston, New Theo. of the Earth, p. 69, imagined the atmosphere of a Comet was the

—the explosive streams of the sun's broad light, chasing away the natural darkness, that blackened the faces of the planets, each becoming the mirror of his loveliness and beauty!!

The radiant light traversing the atmosphere, falling on continents and seas elevating their temperature, excited at once, all nature's active forces. Now she had strength to hold all her parts together and progress forward; and now commenced her busy hour, the hour which ushered into being the economy of Neptunian life. Her Creator said, "Let the waters bring forth abundantly the moving creature that hath life; and fowl,* that may fly above the earth"—"And God created great whales, and every creature, that moveth; which the waters brought forth abundantly after their kind."

Man and the terrestrial animals were reserved for the sixth day, on which the whole living economy was completed; and received finally the divine benediction, "Be fruitful and multiply."

In proportion, therefore, as the several constitutions of primordial state of the earth; material of the Divine Architect; Buffon and others, a primeval sun; all antiquity, a Chaos. It is the type of human production, after which has been fashioned, the Divine.

* The waters or the sea is here represented as bringing forth the feathered races as well as those of the fishes, or rather that God created them in the depths of the sea, which brought them forth.

Since light and caloric were created, we may suppose the temperature of the incipient earth, was that of inconceivable coldness. And since water is a much better conductor of heat than land, the seas would become warm much sooner than the continents, and, consequently, much earlier fitted to become the matrix and support of vitality. Accordingly, we see the sea-life preceded by one day, whatever may have been its duration, that of land animals.

Proceeding upon this principle of water being a superior conductor of heat, and assuming the first continents to have been small islands, Whitehurst, Inquiry, &c., was enabled to bestow a delightful climate upon every ancient country of the world.

It was probably from a tradition founded on this sacred passage, that the Brachmans of India, the early sages of Persia, Egypt,—taught that all animated existence originally sprung from heat and water, as Diodorus Siculus, *Opera*, who recites all ancient opinions, and other early writers, testify.

matter, in the progress of the system to maturity, were evolved, accommodated to the sustentation of the various orders of the living economy, these orders were successively created.

First sprung up, for we must suppose the earth was created with a nutritive, arboriferous soil, the Confervæ, Cryptogames, Gramina Cereal, Floral, the fruit-bearing trees—the Monocotyledons—all the phytological races. Next came in order on the fifth day, the prodigious aquatic life—the leviathan, great whales and fishes,—the ophidian, as we may suppose, Saurian, Ichthyosaurian tribes, Ornithocephali, other monstrous shapes,* outstripping ancient fancy, *bellua biformes*, combining in their make of soaring wings the head of the crocodile, and claws of the lion; and likewise the plumy races.

The earth was covered with branching trees, shrubs, flowers, green savannas; fish sported in the waves, birds soared in the air, before man and the more perfect animals existed. There was a progressive creation of life from the most simple to the most complex and perfect forms.

If we were to imagine the waves of the first seas, breaking over the land, washing up and driving before them this vegetation of the primitive earth, which collected in masses, would sink to the bottom, become covered, imbedded by the sedimentary settlements, and bitumenized by the action of the saline and earthy matters contained in sea-water, we could form some idea of the formation of the coal measures. The remains of the testacea, sponges, madrepores and other lithiferous creatures, abandoned by the sea, would become chiefly decomposed in time. If the surfaces on which they rested, were upheaved by an internal movement, they would give origin to formations, similar to the mountain lime-stone, the ammonitic, belemnitic and others. And this vegetation of the first earth, would stand in the same relation to these coal measures, as the testacea, sponges,—to these formations.

Heavy shades, darkness hang round these subterraneous data, ruins of ancient life, and the state of the world to which

* Vid. Prof. Buckland's Geology.

they point, which have excited so much interest, and engrossed so much attention of modern philosophers. All show that the different parts of the material economy, have *sustentative* relations with the life nature nourishes; that changes in the earth's surface, are marked by corresponding changes in her organic kingdom; and, that in her whole course, she has progressed through continual revolutions, and enjoyed no repose.

In her first state, we behold simple matter existing *sine corpore*,* for the "*earth was void*," a chaos, the *mundorum rudimenta informia*. Here in the first struggle, no life cheered the dark waste of shoreless waters. It was the struggle of brute matter alone. After orbless light existed; and the earth had received her double shape of sea and land, it commenced in its most simple state; radiated as I may say, from a single point, but did not reach its most noble and perfect forms, until after the full completion of the material economy.

Nature, we may say, labored, accomplished much, before she completely evolved and brought forth her great system of life. Warm day-light fell on every land; seas rolled on every shore; stars wandered everywhere in the abyss of

* In the primeval state, the terrestrial matter enjoyed none of the cosmic forms and properties;—"was void." The moderns have entirely lost sight of the distinction between matter and its forms or the *υλη* and *Εἶδος* so carefully observed by all the ancient sages. The *υλη* was the matter or material, and the *Εἶδος*, the form bestowed upon it by Divine or human art.

Πρῶτον μὲν Εἶδος ἃ ζῶν τετραννίδος, says Euripides. The Supreme Cause was *Εἶδος Εἰδῶν*.

Pulchrum pulcherrimus ipse

Mundum mente gerens, similique in imagine formans.

This distinction between matter and its forms, making them separate things, appears to be warranted by the sacred historian. Yet we can have no more idea of matter without form, or in the non-corporeal state, than we can have of life and intelligence without organization.

We may conceive it is by virtue of its forms, which it received from the second effort of creative Power, that matter enjoys all its attractions, active properties, as it is by organization that life and intelligence have their active being. Vid. Harris' *Hermes*, for this distinction of matter and form, p. 308.

space; before the blood started in living arteries, the passions heaved the bosom, new-born thought painted the features, or through volition, impressed new motion on earth's sluggish clay.

From these facts, data, we may deduce several very important conclusions. They are natural commentaries on the philosophy of life.—1. That matter, in the state in which it was first created, could offer, exert no influence upon life: 2. That it was through the changes it underwent in its elaboration into its system, it acquired these influences: 3. That the vital movements are not excited, sustained by the individual, but by the joint forces of the whole system of matter.

And it is only matter in definite forms, balanced, playing in ceaseless attraction; matter exciting movements in its fellow forms, and in its turn receiving excitement;—matter that enjoys life and reciprocates it in its own system,—*which can stimulate life in organic systems*: And it is only matter, that plays in concentric circles, sets out and returns periodically to the same starting points, that can stimulate life, which has its infancy, culminating point, and old age—life mortal. This is the matter of which we speak, whose noble, beautiful forms impel, through all ages, the vital economy.

CHAPTER IV.

THE VITAL ECONOMY.

How infinite, incomprehensible is life! In the animalculæ and confervæ of its descending scale, it passes below our vision; in the elephant, the mountain oak, we behold the opposite extremes. The microscopics live in the roscid drop, and play in its vasty billows; the whale, in size, matches the ocean where he swims.

Contemplated in relation to time, it equally surpasses our comprehension, and mocks the ambitious flight of our science. In its ruins, it appears to have formed largely the earth's solid crust. The vestiges of its ancient forms preserved in this crust, as we have seen, show that all its early models have become obsolete; long since ceased to constitute any part in its economy; that it progresses through a perpetual metamorphosis of these forms. Mystery, darkness hang round on every side.

SECTION I.

IDEA—THEORY—OF LIFE.

THE most general conception of all animation, is that of a special *modification* of the great *action* of the solar economy. This modification is achieved by organization; organization, by a special, created substantive force, which varies in every individual genus of the great living series; but accomplishes more or less perfectly, the same end in all. Organization, therefore, is the *only mode* of vital manifestation for the whole economy. It is both the *immediate measurer* and *modifier* of all vitality.

The earth *original*, presents three great divisions or three great chambers, to lodge all the living families—the atmosphere, land and sea. To each of these there are many properties, qualities—things peculiar.

1. The direction, tendency impressed on the organizing force; or first law of organization is, to furnish, evolve structures to meet, accommodate these peculiarities of the inhabitable chambers.

If it be the sea; the osseous system, if it exist in the creature contemplated, the muscular, nervous, all the organic apparatuses, will have a make and conformation in relation to the physical properties, qualities, &c., of water; and be more or less peculiar. There will be branchiæ, fins.—If it be the land; all the types of the organs will vary, new

ones be added, and present to surrounding objects, new relations, new points of contact, new modes of intercourse. Instead of branchiæ there will be lungs; feet to support the body.—If the creature be destined to fly in the atmosphere, the whole organism will present peculiar relations, adaptations to this element. Instead of fins there will be wings, in place of scales, feathers.—There are some privileged creatures of mixed structures, the amphibia.

By the operation of this first law, each member of the organic kingdom, has its nativity or proper inhabiting element assigned to it—its being defined, circumscribed, located: so that the individual structures or parts of each, as I have had occasion before to observe, will bear testimony respectively;—or are *consignificative* of the material habitudes of the natural places of their existence. If you interrogate them, they will point to the atmosphere, land or sea.

2. Another law or tendency of the organic force is, to fabricate structures in animated existences, in relation to one another. These relations are those of offence, defence, sexes;—subserve in part individual conservation, and that of the species.

3. This force evolves organs, strictly likewise, in relation to the *alimentaria*.

4. It elaborates special structures in relation to some particular forms of the terrestrial matter only;—as the subdermic, nervous tissue, the immediate seat of all the senses with their auxiliary apparatuses, except the eye, in relation to the imponderable agents or the immediate cause of touch, to odours, atmospheric undulations.

5. The organic force unfolds organs in living bodies, in relation to other worlds, as the eye. The medullary structure of both plants and animals, is the immediate seat of innumerable stimulations from solar light and heat. And all living bodies respond to the energy, which causes the planetary movements.

The first class of organs, which accommodate, fit the living being to the inhabiting chamber or natural abode, are

always connected with a general conformation of the entire structure. Or rather, it is these specific organs with this general conformation that constitute the *naturalness* or the nativities, which necessitate and give origin to innumerable varieties in the living contours;—as an acuminate form to plow the waves, branchiæ, air-bladders, in fishes; skin, hair, feathers, in other creatures to modify temperature, mechanical contact of external bodies,—feet, hands, lungs, wings.

The organs of the second class relate to the economy itself, and unite its different members.

Those of the third look externally. Food modifies also prodigiously the living forms;—as the mouth, teeth, assimilating organs, nostrils, neck, feet, cartilaginous nose of the domestic hog; distensible skin of the rhinoceros; proboscis; *ligamentum nuchæ* of the *ruminantia*, &c.

The structures of the fourth and fifth classes, modify principally the action of the universal forces of nature; and connect all living existences closely with the great solar movement. Every separate structure, therefore, of any animated being, combines in its action, either to modify the chemical habitudes of matter, or its general forces; and thereby achieves a definite and useful end in its own economy.

According to this view of the last elements, to which we can reduce vitality, all living tissues can only have sense and meaning in the different substances, habitudes or states of the terrestrial matter and those of its system. Each member of the animated series, through its numerous organs, receives the varied impressions the forces of this system are calculated to excite, and lives,—lives in the great dynamical movement of the whole.

A frozen sun; planets without motion in space, and life progress with all its busy forces—sensations, wants, volition, locomotion;—would not only be unphysical, contradictory, but the *membra disjecta* of things. Were there no sun shedding his warm, radiant beams; no atmosphere, water, flowers, fruits exhaling sweet odors,—to what end in the

universe would look, tend the eyes, ears, noses,—different, special organs, with which nature has fitted up the living races? They would be alone by themselves,—useless—unmeaning—a burlesque to the balance of things. But so far to the contrary of this, she appears to have copied all the beautiful forms of her lives from the earth, and the stars, that burn in space.

The more scientific organology advances, the more numerous, we may suspect, will appear those *vivo-material* correlations. Should science ever reach perfection, each member of the great living family, to some extent or in some sort, will be regarded as a *syllabus* of the vast system, body forms in space; and afford another demonstration of the universal unity, harmony of all created natures.

We may be confirmed in the general truth of these elementary views of animality, from the fact, that it is only through the *organization* of the *solar matter* radiating in space, and *that* of the *earth alive* in its own system, *there is life*. And we may suppose if a portion of matter foreign and distinct from this system, were organized into one of our plants or animals, and placed on our planet or some other, it could not live or exist a moment, because it would not enjoy the general animating forces. The special laws, energies, therefore, which preside over the formation and conservation of organic bodies, exist in close union in nature, with those, which impel to, and maintain the great solar action.

SECTION II.

PROGRESSIVE PERFECTION OF LIFE IN THE LIVING SERIES.

Two circumstances appear to modify and constitute the perfection of every living being.—1. The greater or less number of *rouages* or impulsive points of contact, which connect it with the cosmic movement: 2, the greater or less means, it possesses, in its own economy, of rallying and concentrating the impressions or influences thus received.

Did the lobster have as bright an eye; winnow with capacious lungs as much vital fire from the atmosphere; enjoy as exquisite sensibility; its mind, like Newton's, could not expand all over nature, ride on the wing of deductive thought generating science. In the one case, the impressions through the action of sensibility, would be received; but there would be wanting a suitable brain to concentrate and give them a further elaboration; and a mind in equilibrium, to transform them into perceptions: In the other, these impressions would have a progressive movement. Concentrated in the common sensory, their relations, proportions would be appreciated, judged; they would be separated, united, pass to the form of truth, science.

The separate organs of any animated being, may be regarded as the surfaces, by which it is articulated with its world. The fewer these, the more feeble, imperfect will be the reaction upon the universal forces; the more simple the life; and the more it will resemble that of anorganic matter. And, *vice versâ*, the more complicated the general structure, the more closely it is connected in dependence by the organs circulating the repairing materials, by the centralizing nervous tissue on which all the forces of nature act at once, the more exalted, perfect will be the life. In a word, the measure of organization is the true measure of vitality. The organizing force of all lives, which continues constantly active till death, in its organizing acts, disturbs the equilibrium—offers to the external, material movements modifications, which are the true vital phenomena. Thus a stimulation is only such a movement felt and reciprocated; a sensation, the same or a different one perceived. And in proportion as these modifications are more or less complicated and complete, so is the life.

There are some few conditions common to all animated existences, the base of all their functions. They all modify the chemical properties of the atmosphere or respire;—are nourished; reproduced;—possess innate principles of motion and sensation. These principles, through which their world

impresses all its support, influences; through which they hold intercourse with it and themselves, constitute the essence of their being. Consequently they must all have organs analogous to supply these functions; and are but *one* with various degrees of perfection, in the physical order of the universe. “La motilité vitale nous offre,” says M. Dutrochet, “chez tous les êtres vivants, les mêmes phénomènes principaux. Partout il y a *nervimotilité*, et par conséquent *nervimotion* sous l’influence des agents *nervimoteurs*; partout aussi il y a *locomotilité* ou faculté de changer la position des parties.” Les végétaux offrent, comme les animaux, ces deux facultés de mouvement; mais elles sont, chez eux, bien moins énergiques, bien moins développées.”* This *vital motility*, present in each molecule of all living bodies, varies, in energy, throughout the animated scale.

To begin at the foot of the inverted pyramid, the image of life, the vegetable families manifest it in the feeblest degree; and present correspondingly the greatest simplicity of organization. Their rudimental medulla, for, in the paucity of all other structures, we cannot conceive of life in the absence of this, primary seat of this *precious, motile power*, seems just sufficient to enable them to receive nutrition, convert it into their own proper substance—serves simply for reproduction, growth and decay. Almost isolated, cut off from the great action without, all their efforts exhaust, and terminate in themselves. Their medulla, too scanty, falls short of reaching intellectual and moral life.† From the abundance and diversity, however, of the phenomena of vegetable animation, we must suppose it is exalted very greatly above the chemical action of mineral bodies.‡ And

* Recherches anat. et physiol. sur la struct. &c., des anim., et cet. p. 5.

† Dr. Darwin attributed to plants sense and moral feeling; to some even, a rapacious, carnivorous appetite. Listening to the voice of the Muses, enjoying their sweet intercourse, he threw over flowers, some of the light of their inspiration. Vid. Botanic Garden.

‡ The ideas of a living Creator and a dead creation are incompatible.

the chasm, which exists between this action and vegetable life, must be infinitely wider than that between the two lives of vegetables and the *Radiata*.

Contrarily to the order of vegetables, the medullary globules or threads, when they are visible, are disposed in these *Radiata* with the organs of sense and motion, about a central axis. This arrangement satisfies the conditions of sensibility and voluntary movements—the first forms of desire, perception, thought. The phenomena of their being extend beyond themselves in a limited circle; and they feel more of the universal forces without. Containing more of the elements of animation, they form the union between plants and animals, and participate in the lives of both. They organize more of the chemical elements, than plants commonly do; or are quaternary compounds. Life, therefore, reaching rudimental animality, takes in, at once, all the varieties of the organifiable elements of its most complete and perfect forms. Consequently its progressive perfection does not depend so much upon the number and diversity of these elements, as upon the completeness of the organs themselves, and their central conformation.

In the *Articulata*, the brain, seated on the œsophagus, furnishes nerves to the parts, which belong to the head. Two nervous cords embracing the œsophagus, extend along the abdomen, unite at certain distances and form ganglia, from which arise the nerves that supply the body and extremities.

Here the distinct organs are more multiplied, and more complicated in their articulations. And here we behold the first distinct beginnings of that centralization of organs, and circular, vital movement, so complete in all the more perfect races.

The nervous system of the *Molusca*, contained in the same envelope as the viscera, is formed of masses connected by

Death is only action suspended, or change of form. Wherever there is being, there is motion: all live in their own manner. The life by organization is only life special, pre-eminent.

nervous filaments. They have the organs of taste and sight, a complex digestive and secretory apparatus, a perfect system of circulation, and particular, respiratory organs.

Accordingly they present more points of contact, more numerous relations with external bodies, modify more the great action without; and in proportion, their vitality expands rapidly into a still wider circle. To the perfectness of their distinct, pulmonary and sanguiferous organs, conveying promptly to their nervous system atmospheric oxygen so indispensable to all living motion and perception, is greatly due their vital superiority. In them we observe the obscure dawnings of the mental and social life; and the germ of those sensibilities, which in the more perfect *vertebrata*,* articulate their wants in the voice of thunder.

A body composed of double organs, divisible into two symmetrical halves; a multiform, nutritive apparatus for the generation of blood; a blood rich and abundant in closed vessels; a complex, sanguiferous mechanism, which compels the whole of this blood to pass through the lungs at each revolution; the lungs capacious; the means of excretion and secretion, varied, abundant; a brain voluminous and complicated with the spinal marrow extending through the longitudinal axis of the body, and the nerves freely distributed to every part; a skin, warm, smooth† and pliable, the

* After all the improvements proposed, rejected, adopted, nothing is more arbitrary than zoological classifications. The distinguishing features of animals fade away, pass gradually into one another. Nature originating them, I may say, did not consult the convenience of philosophers, who study them. Their distinctions to be true, must, for the most part, be understood in a very general manner. Yet classification is indispensable to accommodate the weakness of our faculties.

† From the very fact that *man is born naked*, we should conclude, *à priori*, he was born to *think* and *feel*—to enjoy exquisite intercourse with nature,—participate fully in the great action of his world. But to suppose the hair, feathers, scales, shells and bony substances, with which other creatures are covered, and isolated from external contact, diminish the impetuosity of their feelings or sensations, is unphilosophic. For it is certain the nervous tissue bears relations and proportions with each organic part of every living individual, which, consequently must put their cutaneous sensibility in harmony with the *velamina*, by which they are enveloped.

medullary globules forming a tissue everywhere beneath it; the faces of all the organs looking centrally—present us the idea of the most perfect model, the organizing force has reached in our world. It is the idea of organic man.

Here altogether different from the *Radiata*, but less different from the *Articulata*, and still less from the *Molusca*, every thing is distinct and separate; an instrument for every action, or a particular organ for every particular function. The atmosphere is received neither by branchiæ, tracheæ or cutaneous imbibition, but is freely and voluminously admitted into the pulmonary cells for the arterialization of the revolving blood; all the organs exist in the strictest subordination and reciprocal dependence; the vital movement is from the centre to the circumference, and *vice versa*, or circular, the great type of motion, which prevails the most extensively in nature.

SECTION III.

VASTNESS OF THE ECONOMY—DISCREPANCY, RECIPROCAL RELATION OF ALL THE PARTS COMPOSING ANY ANIMATED BEING.

FROM minuteness of the form; impossibility often of deciding upon the identity or difference of species; mutations by successive generation; locality; climate and other causes, it is impracticable to know the number or variety of lives the earth nourishes. The whole amount may be from ten to fifteen millions. Great, however, as must be the actual number of living species, in their structures and functions, so far as these will hold out in the lower orders, they all present relations, points of contact with one another—are united by close affinities. So that the simple notion of all animation, as before intimated, is that of a greater or less combination of organs, which coaptate in their general forms, and respond in their properties,—conditions of functions,—to external matter. The functions, therefore, so far as they will go, however much the organs may vary in number and form, must be identical, being the *modifications* of the *physi-*

cal, material properties, (which continue the same,) by the *vital or organic*. This law of the universal identity of functions, of affiliation of structures in all living existences, holds so rigidly as to impress upon us the idea of a plan or system of original formation; of a solitary Contriver, Creator, and, in the great presence of visible things, or physical order, as I have said, constitutes them a *unit* in nature's whole.

What infinite diversities, contrarieties, compose this living unity! The types of the organs in one order of life, are changed in another; soon all the original types are lost, while the organs themselves still answer to the same functions. If the organs of the superior races of animals, as M. Serres has shown,* in reaching the perfect, permanent forms from the embryos, are metamorphosed or passed through the types of the inferior races; nature, as I may say, in getting from one creature to another of a different order, passes through an infinitely wider field of organic transmutations. Looking along the living line, we behold series on series of groups of organic structures; each composes a separate order of life. The group nearest us suffers considerable change in reaching the next; the types of the organs are altered, disappear; new ones take their place; soon again they fade away, and are supplied by others still newer. Nothing in the whole length of this line is permanent, fixed, but the transitions, changes:—From simple atoms, which unite by vital attraction and live, as in the *confervæ*, to man, who dare glance his Maker consciously in the face, these changes hold with the strictness of laws.

* “Les embryons ne sont donc pas, ainsi q'on l'avait imaginé, la miniature des animaux adultes. Avant d'arrêter leurs formes permanentes, leurs organs traversent une multitude de formes fugitives, et de plus en plus simples, a mesure q'on se rapproche davantage de leur point de départ. Ce que ces formes embryonnaires ont de tres-remarquable dans les classes supérieures, c'est qu'elles répètent souvent les formes permanentes des classes inférieures. Les classes inférieures sont expliquées de cette maniere par l'embryogénie des classes supérieures, et les embryons des classes supérieures répètent successivement les formes permanentes des classes inférieures.”—Anat. Comparée du Cerveau, &c. Tome i. p. 15.—A work, which exhibits alike the abilities of its author, and the great national progress of thought in France.

In consequence of this continued change of the organic types, and the functions, where they exist, remaining always the same in all, of what tremendous import how many distinct sorts of things in nature mean head, brain, heart, stomach, neck, mouth, teeth, nose, legs, feet, &c. Feet, legs in the *Annelides*, for instance, are simple folds of the skin or tubercles armed with setæ; in the great mammals, the elephant, they are huge columns of bones—of bony structures. In the *Radiata*, mouth chiefly is a pore in the skin; in the lion, crocodile, a devouring sepulchre. How grand, majestic the march of nature, unfolding the living economy, the circle of vitality expanding, as she advances till man! And how noble, lofty the flight of MM. Geoffroy-Saint-Hilaire, Cuvier, Duméril, and such men, who pursue her footsteps, and look out her ways!

But if the morphology varies in all, the particular structures of any living body, differ as much from their fellow structures, as the body they help to compose, differs from any other of a distinct genus. What resemblance, for instance, is there between the brain, the enveloping membranes, and cranial covering; periosteum, bones, liver, stomach, muscular fibre, cellular membrane, nerves?—Bichat,* with others, has made efforts to ascertain and fix the number of the primitive tissues or original anatomical elements which immediately compose the organs. Each of these organs, however few or many of these elements they may have for base, enjoys peculiar modifications of the organizing force, or possesses a sensibility and contractility, primary powers of all organogeny, which is special. Consequently, each has a mode of animation and diseasation, which is likewise peculiar, but not independently of one another. All live in their own way, but live only by pouring the separate streams of their actions or lives together, forming the vital whole of the individual of which they are the organs.

* General Anatomy. For a summary of these efforts, vide *Physiologie de l'Homme* par Adelon, tome i.

SECTION IV.

RECIPROCAL DEPENDENCE OF ALL THE PARTS OF THE ECONOMY—
RELATIONS OF THE ORGANIFIABLE MATTER—ITS FIRST COMBINA-
TION INTO THE LIVING FORMS.

IF, in every living body, the peculiar life of each distinct organ, is dependent upon the general life of the whole and reciprocally, not less so are the lives of each one of the animated series. No living being can hold, beyond a certain duration, the elements of its material composition, and these elements appear to be indefinitely reorganizable into new forms. Thus, in relation to time, the economy progresses by means derived from its own stores, carrying the principles of its motion in itself. An enormous amount of matter must be consumed every moment in the organizing process; and the forces at the superior extremity of the scale, seem limited in their operation principally to these bodies or elements, which have been subjected previously to the organic state at the other extremity. Or the vegetable is subordinate to the animal life, in elaborating the materials. The primary organifiable elements of vegetables, from the hour of creation, appear to have been set apart, and constitute a sort of perpetual inheritance for the vital empire, which the flames of life, constantly burning, have never exhausted or consumed.

Progressive, perpetual life, therefore, necessitates perpetual death; and likewise, generations, ages. Every member of the economy enjoys life at the expense of what had previously lived; and, in its turn, is compelled to urge future life onward in the shape of food. The constant, inflexible order of nature, is *Pasti estis, pascendi; cibaria extemplo sumite, quippe cibaria eritis*, which all obey. The individual forms and lives are lost; the *organizability* or susceptibility of organization of the debris remains indestructible—condition of new forms and lives.

What variety and proportion of terrestrial bodies may be

susceptible of the organic state, we may suppose to be indeterminable. From the modern researches of vital chemistry, whose positive knowledge will probably ever remain extremely limited, we are assured the variety is considerable. We are not, however, to suppose it has determined all, which nature has subjected to the action of life; and drawn the line of distinction between those that can live, and those which play off their attractions for ever in the state purely mineral.

Indeed it would appear, the organizing force or attraction has the marvellous power of forming compound bodies in the absence of their proper chemical bases. Spallanzani and others fed poultry on substances, which contained no lime, and yet their eggs had shells like others. If this force can revolutionize, transform the elementary chemical bases, the decomposition of organic substances, to ascertain the primitive elements of their constitutions, is fallacious.

Be this as it may, the greatest part of the visible earth is withdrawn completely from the organic empire. Deep in its entrails, beyond the contact of its atmosphere, there can be no life. On its surface vast deserts of loose, siliceous sand, roll amid the flames of the equatorial sun, which has never submitted, or been moulded to living shape. In the cacuminal range of all countries, everywhere, a large portion of this surface at a period when there was but little life—in the infancy of the planet—appears to have been seized by the chemical forces, and crystallized into the lapideous forms, which have remained till now undecomposed, and have never nourished plants, and through plants, animals. These rocks, of which the earth is full, bear no traces of the living structures. Time appears to have no power over them; they are truly indestructible. The rocks about Tenedos and other places, so accurately described by Homer, modern travellers assure us, correspond still to his description—are the same, as in the flourishing days of Troy—before all nations.

While, therefore, all bodies are equally alike subjected to the molicular attractions, we may conclude, there is only a

limited number susceptible of the organic state. Oxygen, hydrogen, carbon and azote or nitrogen, appear to play up to, and yield most easily to the vital attraction. All organic bodies yield them, more or less, as their last bases; and all soluble, decomposable substances, containing them are nutritive. They appear essentially to be the *vitaliferous elements*. All non-organizable bodies stimulate, exert a constant influence on the vital functions. The balance between the two, we may suppose, is maintained in nature by an unknown law; and life is measured out in just proportions.

Since the debris of all living bodies, is capable of spontaneous combustion; and an impetuous fury urges all creatures to reproduction, were these bodies allowed an unlimited augmentation, or an increase in disproportion, it is evident the economy would suffer. There is then likewise an equipoise maintained in the organizable matter itself; between that portion, which lives at any given time, and that which exists simply as chemical elements or debris.

M. Chaptal regarded the whole, solid crust of the earth as having been formed by organic debris;—or that, in the progress of ages, it acquired its solidity from the living ruins. But to adopt this view, to the full extent, would be to admit, that all bodies have been indifferently, or are equally organizable. We behold only the surface, the great, active exclusive theatre of life; and the remains of its ruined forms, are not found beyond a given depth beneath.

The organizable elements do not present the same relations to the whole living economy. The vegetable kingdom is the door of entrance to the animal. The herbivora could not be subsisted by the juices, which nourish the plants, they crop for food; nor could the carnivorous races, which make them their prey, live on the plants that nourish them. Passed from the vegetable to the animal tissues, these elements traverse different routes, in getting back to the mineral state. They are constantly thrown out by the excretory functions; are transferred by re-assimilation from one body

to another; or the animal dying, and not devoured, return again to become the food of vegetables, and commence a new revolution.

Thus every part of the economy is reciprocally dependent upon every other part; and, thus these elements, in traversing the varied streams life pours along time, receive from it a double stroke, before they are freed by death. Where the prowling wolf deposits his dust, the grass grows luxuriantly, a feast for the lambs he devours; where the huge mastodon, destroyer of leafy fields, lays him down the last time, the plants he consumes, rise up again in vigorous growth, drinking back life from his ruins.

Naturally immortal, death has no power over the *viabile* elements. It simply frees them from the vital attraction; is the pivot round which they wheel in the eternal circle of action. They belong properly to no particular form of life; but are the disinterested, public functionaries of the general life of the economy.

Indifferent alike to all living shapes, they manifest no power, tendency spontaneously to *organesence*. They combine only in living bodies, according to the laws, I have mentioned, under the action of the vital principle, peculiar in all the different orders.

The old doctrine, then, the mother-idea of which was born in the school of Democritus, the great teacher of the atomic physiology,—“That all living creatures sprung, at first, in the vermiform shape from molicular union, and in progressive time, reached their present forms,” has no support in experience, history:—A doctrine round which the Muses have flung their gaudiest dress,* and philosophy

* Terra cibum pueris, vestem vapor, herba cubile
Præbebat multa et molli lanugine abundans.

At novitas mundi nec frigora dura ciebat,
Nec nemios æstus, nec magnis viribus auras.
Omnia enim pariter crescunt, et robora sumunt,
Quare etiam atque etiam maternum nomen adepta,
Terra tenet meritò, quoniam genus ipsa creavit
Humanum, atque animal prope certo tempore fudit

- poured the full strength of its reason and eloquence:—A doctrine, which has been kept alive all ages; countenanced by a few honest men in modern times;* and strenuously urged by some *Penseurs philosophiques* of France and Germany, for no other purpose than to dispossess us of the charm of a conscious superintending Deity, Creator. Forlorn! such an idea had ever afflicted the human bosom; and caused so much magnificent labor to extinguish it in the world, itself the world's supreme beauty and ornament; when too of all natures, humanity most needs the sense, use of such a Being.

Omne, quod in magnis bacchatur montibu' passim
 Aëriasque simul volucreis variantibu' formis.
 — Nunc quæ causa Deûm per magnas Numina genteis
 Pervolgârit, et ararum compleverit urbeis,
 Suscipiendaque curârit sollennia sacra,
 Quæ nunc in magnis florent sacra rebu' locisque
 Unde etiam nunc est mortalibus insitiis horror,
 Qui delubra Deûm nova toto suscitât orbi
 Terrarum, et festis cogit celebrare diebus:
 Non ita difficile est rationem reddere verbis.
 Quippe etenim jam tum Divûm mortalia sæcla
 Egregias animo facies vîgilante videbant,
 Et magnis in somnis mirando corporis auctu.
 His igitur sensum tribuant, propterea quod
 Membra movere videbantur, vocesque superbas
 Mittere pro facie præclara, et viribus amplis:
 Æternamque dabant vitam, qua semper eorum
 Supeditabatur facies, et forma manebat.

These passages, I have quoted, contain a summary of the gloomy, wretched philosophy of the celebrated poem of Lucretius, "*Rerum Natura*," beginning book 5th, line 814.

* Vide the *Zoonomia*, Darwin, vol. i, p. 392, 4th American edit.; and p. 397, et sequente, where he labors to establish, from the phenomena of living nature, that all the variety of animated beings, have sprung from the same rudimental beginnings, by the progressive evolution of the organic forces. It is the idea of Democritus, dressed up in the costume of modern, improved science;—an idea which supplants a Divine creation of lives, and was unworthy of his noble mind. It is unaccountable, many good philosophers, like him, still torture their ingenuity to retire as far as possible from the presence of the Divinity.

Since, then, the *viable* elements, of themselves, are incapable of vital combination, or independently of the attraction of the vital principle; the first of the series of all animated beings, must have had an origin altogether different from those which have proceeded from them.

This view is confirmed by our most ancient and sacred writings; by the traditions, legends of all ancient people. According to the Edda, Askus and Embla, or Adam and Eve were formed by the sons of Bore. Other ancient books contain similar accounts.*

The statue of the first man was fashioned by the hands of the universal Creator, but it did not respire until after the breath of lives was placed in its nostrils. It had nostrils. It continued to live, it had lungs to respond to the breath of lives; it lived, had blood, heart and arteries ready formed to make this breath effectual, or to transfer the blood to the lungs for oxydation; had brain and nerves to receive the influence of this breath, without which it would fall short of life and a "living soul;"—all the tissues proper to the human form, not now plastic clay, but such as we behold in the living subject.

In this formation, we may think, were established the organic forces, which since have shaped the clay or viable

* It would appear, many ages after the flood, men were satisfied with the knowledge and opinions they had received from their antediluvian fathers; and it was not until after extensive wars had been waged; great battles fought; and considerable empires established, that thinking and speculation made much progress. Their knowledge rapidly increased, but truth walked by the side of colossal error.

The peaceful Divinity, they brought with them across the flood, no longer answered to their wants, and the clamor of their ambition. Rulers must excite popular superstition to assist their authority, as Numa Pompilius, who pretended to consult, on public matters, the goddess Egeria.

The charms of war, and the glory of its leaders, must be dressed out for the eye of posterity. A variety of supernatural agents are wanted, which give employment to priests and the poets. The first pure knowledge of the Creator is lost, and men attribute the first formation of things to Saturn, Venus, Tellus.—Vanity perpetuates the delusion—patriotism, all the passions become the fruitful mothers of gods.

elements of our bodies into the structures proper to them. These forces unexhausted, unchanged in their actions and results, have continued since to be transmitted through all generations. In the same manner, we must infer, every member of the economy received existence in the beginning.

CHAPTER V.

ORGANIZATION AND LIFE.

LIFE, base, condition of all happiness and good, its love was deeply planted in the frame-work of all conscious existence. This inseparable love is nature's testimony to its precious gift.

Its fragile nature and high consequence among things, stand out in bold relief from the pains, I may say, the strong barriers, thrown round for its protection and conservation. To warm it, a thousand suns wander in the sky and burn. In the equable, solar motions, its functions are equably regulated. It soon grows weary with action and needs repose. To aid, secure its rest, night draws softly over the world her dark mantle, wrought with shades and dreams, and shuts out innumerable stimulations, which would but torment. Again she lifts it up to let in the sun's broad blaze, to arouse it to activity. Hence, antiquity grateful, erected night into a Divinity, and put on her a shining robe of stars. To keep the constantly changing fuel of its flames burning, the air is drawn round the earth, and presses closely its whole surface. To cheer, animate it, the floor of each ocean was spread out to hold the waters: each stream meanders—nature, in all her forms, waits round to supply it, as if conscious of its constantly returning wants.

For it kindle inextinguishably in a parent's heart the fiercest fires. For it friendship was born forging burning

chains, which secures gregation, society. Where it perishes, the laboured, lettered stone, lifts its white form, to converse with desolating time.

The love of life manifests itself, peers out, in all our conscious acts, forms, as I may say, the visible exterior of our being. Its sped hope recaught, pushes forward, for awhile, the lagging blood of the dying man; brightens again his eye; invigorates his voice; and smoothenes out the features, which death was arranging for the long, dark night before him.

All the objects of visible nature appear to obey general laws; to be united in one great action; and their phenomena stand in relation to one another, as cause and effect. They all possess inseparable properties, through which they respond to these laws; and present the sensible universe, as the scene of ceaseless, harmonious, co-ordinated activity.

Hence some philosophers, as Campanella, Cardan, Van Helmont, delight to contemplate all sensible existences, as enjoying life alike; as participating in the universal life of the world. Antiquity took much pleasure in such hylozoic views, as is evident from their works. The great error of these partisans of this arbitrary, absolute philosophy, as it has been styled, is, that they did not distinguish between this great life, and the life of plants and animals; but regarded the latter only as *particular manifestations* of the activity of the fundamental force of nature *modified*. Or they made a modification of the cause, which moves all bodies, the immediate cause of life in plants and animals. In a certain sense, every being may be said to have life, since every one is active; but not the life of plants and animals, which, in them, depends upon the organic force,—a force, that differs entirely from all the other forces of nature.

Since the days of Glisson,* most all the great physiologists, as Haller, Blumenbach, Barthez, Hufeland and Tiedemann,—attribute the phenomena of life immediately to a vital or organic force, special, peculiar to living bodies. To

* Vid. his De natura substantiæ energetica—de vita naturæ.

confound, therefore, the acts of this force and the force itself, with those of gravitation, the molecular attractions, and their cause or causes, is unphilosophical, and an abuse of all language. We must distinguish between the fundamental energy of nature, of the activity of which all beings participate in the manifestations, and the plastic, vital force; and between the universal life, and the peculiar life by organization. They are distinct things. These manifestations of activity, as I shall show, when sensation will be the subject of discussion, offer to the organic cause, the incitations, and connect closely all living movements with the great movement of the world; but these movements flow out of the organic cause, are alone due to it, and, consequently, form a class of phenomena particular and distinct from all others.

We know not vitality in its extent or essence. Its fountain is the same, whence all visible existence has emanated. When the divine poets and sages would impress upon us the deepest sense of the Divine nature, they call him the *living* God. Life is eternal; its actions irradiate infinite time and space, constituting their fulness. Its streams above flow on without ages—full. Beyond the great solar walk, or the sphere of sorrow, where all good men, through love and obedience, fix their hopes, pestilence does not stir, fevers burn, or coffins drink up its rolling, tranquil waters. Each season comes laden only with good. But, here below, placed entirely in dependence upon matter and organization, which limit and measure it out, its vigor is crushed; its fulness lost; it vacillates; its actions intermit; and it keeps along with time only by the perpetual renewal of its forces.

To this life, descended from the same fountain in the Being of beings, most all the material properties, energies, are in exact opposition, which *to be*, its efforts must overcome. The statical and chemical forces constantly dispute strength and empire with the organizing energy. Hence life's unsteady fulness and motion; time's feeble movement, which is itself exhausting, carries it hence; while the great trans-material life stands firm against the strength and mighty rush of eternal duration.

SECTION I.

EXAMINATION OF THE PHYSICO-CHEMICAL THEORY OF LIFE.

It is a question among philosophers, -whether life and organization be only a particular mode of the existence of matter, or of a nature *sui generis*. Some have manifested anxiety to remount to the source of life, and ascertain the fundamental cause of all its movements. It exists in the midst of the most impenetrable obscurity.

According to the statement of Martini,* with others Gardini obtained great reputation in Italy among the native philosophers, for applying the laws of electricity to the explanation of the living functions. Dr. W. Philip, of England, labored hard, and with much pleasure, to establish the identity of the galvanic and nervous fluids.† Since the nervous tissue is concerned in all the vital acts—base, unity of all the functions—this *identity rigidly admitted*, the whole phenomena of animation, would be but little other than the attractions and repulsions, the *sequences* of the activity of the galvanic fluid.

MM. Georget,‡ Fourcault, and their sectaries deny the existence of a vital principle, of all vital properties, discard them as ontologisms, and maintain the nature of life is purely chemical. “En étudiant les phénomènes attribués à la sensibilité dans la série des êtres, il est facile de voir que cette propriété, telle qu’ elle est admise par les vitalistes, n’ est qu’ une entité, et que l’ on doit rapporter les phénomènes de l’ excitation et de la sensation à des courans électriques et à des actions moléculaires dont le système nerveux est siege.”—“La vie n’ est donc qu’ une succession de phénomènes déterminés,” continues the same author, M. Fourcault, “dans les corps organisés par l’ action des fluides

* Elém. de Physiologie, p. 28.

† Experimental Inquiry into the Laws of the Vital Functions—passim.

‡ De la Physiologie du Syst. Nerv. &c. tome i. p. 45.

électriques, ou par celle des causes excitatrices extérieures et intérieures; elle résulte, ainsi que nous venons de le prouver de l'action intime et réciproque des fluides et des solides doués de propriétés physico-chimiques à un haut degré d'intensité."*

Since analogous conditions, under which electricity is spontaneously developed in inorganic, exist in living bodies, it is but reasonable they too, in the changes of the states of matter their functions constantly achieve, should evolve and manifest it. In the actual state of science, it must be admitted, in the majority, if not in all the vital acts, as in the assimilation of the repairing materials; nutritive decomposition of the organs; hæmatogeny or change of venous into arterial blood; the secretions, &c. galvanism or electricity by contact, displays its action or suffers its state modified.

From the zigzag manner the muscular fibres contract; from the angles of flexion being always situated at the same points; the nervous filets here and there cutting these fibres at right angles, MM. Prevost and Dumas were led to regard the phenomena of muscular contraction, as *electrical*; and as taking place according to known electro-dynamical laws.

A great number of experiments prove there exists some analogy between the mode of action of the galvanic and nervous fluids. The experiments of Dr. Philip, to whose work I have alluded, supporting chylication, respiration, and exciting other vital functions by supplying a galvanic current in place of the nervous influx, after the proper nerves had been completely divided, were repeated and verified in France by MM. Lavasseur and Edwards. Similar experiments were made by Pfaff, Ritter and others with the same results. Without the communication by a metallic arc, Aldini placed the denuded nerve and muscle in immediate contact; and the muscle contracted the same as if the galvanic fluid had been applied to it. The only condition necessary to the success of this experiment is, that the parts upon which it is made, should be endowed with a high degree of vitality. It

* *Lois de l'organisme vivant*—pp. 126 and 319. Tome i.

is known the eel of Surinam, *Gymnotus electricus*, and some other fishes, generate, secrete electricity, with which they attack their prey and their enemies. Prof. Tiedemann mentions, likewise, some of the spiders as electrical.

Electricity forms an atmosphere about the bodies, which conduct it, as the experimental science shows. In imitation of this expansion or law of electricity, it has been thought by many, that the nervous fluid surrounds the nerves to some distance, which generate or conduct it; or forms about them a true atmosphere. It was in this way, Reil, as I shall notice in a future chapter, explained the sensibility of parts and the transmission of sensation from one tissue to another, where no nerves could be traced, or nervous communication discovered. M. de Humboldt observed, in experimenting upon living animals with galvanic electricity, that the muscle contracted before the metallic arc connecting with it the nerve, came in actual contact; and regarded this phenomenon as taking place through the intervention of a nervous atmosphere. Desmoulins, rich in the power of observation and reasoning, maintained—"except the optic and olfactive, the cephalic and spinal nerves are not continued from the cerebro-spinal axis, but are simply in juxtaposition, and, consequently, demand for the execution of their functions, the transmission, at a distance of the nervous fluid, in imitation of electricity, forming atmospheres about its conductors."

This view of Desmoulins corresponds with Humboldt's observation of the contraction of the muscle, before the contact of the galvanic conductor; and with the deductions of Reil, in relation to the transmission of sensations and existence of sensibility in parts devoid of visible nerves.

The energy of sensibility—of the nervous phenomena of different parts of the body,—appears to be in relation to the number of supplying nerves, and their various expansions;—to the extent or amount of surface they present. The belief likewise has prevailed among philosophers, that the intensity of the electrical phenomena, was in the ratio* of the extent

* Within a very few years, this view of the subject, if not completely

of the surfaces, from which the fluid was disengaged; so that there exists an analogy between the electric and nervous fluids, not only in regard to the manner of their activity, but likewise in regard to the accidents of their generation or production.

Upon these data, M. Desmoulins advanced with argument apparently conclusive, that vision is as much more extended, as the retina is folded internally upon itself; that the understanding is not in relation to the volume and mass of the brain, but to the extent of its external and internal surfaces, or to that of its convolutions without and ventricles within. Thus he admitted or erected into a law, that *the energy of the nervous action is always proportional to the extent of the nervous surfaces.*

In the actual epoch, Dutrochet has gone beyond all his *devanciers*; trod on some new ground; and given to the chemical theory, a novel and more resplendent form of reason and argument. His discoveries are in the crucible of time, which will do justice to him and the science.

The active agents of his two great classes of vital movements, *organico-endosmose* and *exosmose*, are electrical currents passing in opposite directions. Upon these two classes depend all organic composition and decomposition. Their phenomena, therefore, include the essence of whatever appertains to vitality; and since they are electrical, *electricity* is the *prime mover*, the *cause* of all animation. But we must refer to his work,* for the expose of his ingenious views.

MM. Becquerel and Bachoué de Vialer, with great care subverted, could not be confirmed by an association of American philosophers at Philadelphia. They constructed a Voltaic pile with very large plates, but could not discover its power was any greater than another of the same number of plates of half the size. So far, therefore, as the truth of the argument of this philosopher rests upon this analogy, it must fall short of demonstration. And if the intellectual faculties be in proportion to the extent of the external and internal surfaces of the encephalon, they must be so from other causes or laws than those which regulate the galvanic phenomena.

* L' agent immediate du mouvement vital dévoilé dans sa nature, et cet. passim.

and aid of much natural science, each in a separate work, have completely unveiled the mystery of all aggregation, union of living molecules; all sensation, volition, thought, sentiment—the vital functions separately—by the different operations, combustions, neutralizations, &c. of the galvanic imponderable. Finally, the advocates of transcendentalism, the polarists behold life, as appertaining to all the bodies of nature under two different forms. In some, they say, it is manifest; these are appropriately styled *phænerobiotic*; in others, it is latent or concealed, which are termed *cryptobiotic*.

They advocate a substantial vital nature or an *imponderable biotic*, evolved from the action of life, different from the galvanic, electric, or magnetic fluid; in which resides essentially the living, dynamical force. Vitality is no solitary exertion of power; is neither mechanical nor chemical, but consists in the conjoint action of the modification of all known powers. In this action, consequently, are developed the attractive and repulsive forces, the force of cohesion, gravitation, the chemical attractions, oxydations, deoxydations, the phenomena of galvanism, of all the imponderable agents. All these forces, in whose equipotent activity and struggle consists life, are modifications of two secondary forces, which continually attract and repel, remain always in opposition; for this reason are denominated *polar*; and which are derived from an universal parent force in its nature inscrutable.

The polarists explain the philosophy of organic chemistry—the living functions—by the equilibria, predominances of these forces, effecting continual molecular changes in the organized and organescent matters; and lay great stress on *oxygen*, *oxydation*, sign of the predominance of the contractive force; and on *hydrogen*, *hydrogenation*, the *inflammable principle*, which characterizes predominant expansion.

Since the vital phenomena are caused or arise from the action of the *imponderable biotic*, the galvanic, magnetic, and other imponderable and ponderable energies, originating chemical modifications in the substance of the organs, the polar acknowledges, with the manner of operation, all the

active forces of the electro-chemical theory of MM. Dutrochet, Becquerel, Bachoué de Vialer, and others besides. Like the electro-theorists, the polarists recognize the oxydation and deoxydation of the organs, and the constant determination of chemical actions, which give rise to galvanic currents.

These currents move in concentric and eccentric directions, cause new chemical movements, and thus sustain the organs in play. The polar theory differs principally from the electro-chemical, in the much greater number of active elements it employs for base; and in going a few steps further into the dark.

From the number and variety of active causes of life, of which the polarists speak; from the undefined, indefinable nature of their separate and joint agencies, it is extremely difficult, for those not accustomed to touch and handle the tenuous structure of their theory, to profound their views. Indeed, if the logical order of ideas exist throughout, from any exhibition of it yet made generally public, it is perplexing to trace. In this theory, philosophy lifts its colossal form, and hides its awful head beyond the clouds of Italy and Germany; but we may expect it long, before it expands any clear and useful light.

The electro-chemical theory rests manifestly, wholly on the electric or galvanic laws, as developed and demonstrated in inorganic matter, applied to living bodies for the explanation of their functions. In all *chemical actions* or changes *whatever*, observes M. Bachoué illustrating his views, electricity is more or less developed. There exists simultaneously, in all the organs, a chemical action from the conversion of venous into arterial blood, and from the transformation of this blood again into the venous. The nervous centres, through their nerves which are conductors, communicate with every part of the organism. There must, therefore, be established in each nervous cord, a continual galvanic current, going from its central to its peripheric extremity, and contrarily, as the chemical action, from which the

current emanates, predominates at the one or the other extremity; or according to the electro-chemical law laid down by M. Becquerel: — “That when two substances, brought into communication with each other by a conductor, exercise, at the same time, a chemical action on a third, a galvanic current is developed, which is always directed from the substance, in which this action is the strongest, toward the one in which it is less so.”

It is this current, according to M. Bachoué, which determines all the actions or functions of the organs. This current itself is derived from the display of chemical affinity. *Chemical action, therefore, developing galvanic electricity, is the productive cause of all the vital phenomena*—of the formation, growth and decay of the organs—of sensation, reflection, sentiment—of the tender fires which burn in the lover’s heart; the spirit, which wept in the eyes of Corneille; of the genius, which conceived the *Paradise Lost*, the great, enduring song of Troy.

Thus the electro-chemical theorists explain the cause, mechanism and operations of life, which have passed into a physiological doctrine, that claims for partisans philosophers of real merit and genius. We will now offer some views, which, to us, render their reasonings unsatisfactory, and inconclusive.

All the bodies of nature, with their component atoms, appear to manifest a specific capacity, or exert with a force variable among themselves, an attraction for heat, electricity—for all the imponderable agents, which they sustain in *equilibrio*.—Nay, their different states, habitudes, the changes through which they pass in time, seem to be subordinate or depend upon the dynamical laws of these agents, of which all the various attractions may be the simple manifestations. So long as this equilibrium is maintained, these agents are not put in evidence; hence so little known to antiquity, their detection being difficult by the senses alone. But the moment they are brought into disproportion with the specific capacity of bodies or the equilibrium is broken, they dis-

play their phenomena. Thus the metallic plate charged with the magnetic fluid, shows the mariner his path through the sea; and the electrometer, by a few turns of the wheel, becomes animated as with a new existence. Life, likewise, by nature's art, in the molecular changes through which it conducts matter, breaks this equilibrium, and develops, manifests electricity.

Now if nature only formed magnetic needles and electrometers, and they could not be deprived of their activity but by the complete destruction of their forms; and some philosopher, in the progress of time, should discover their pores were penetrated by a subtle, active fluid eliminated in their operations; and were to conclude not only their polar phenomena, but likewise all their sensible properties, formation and constitution, were due to the agency of this fluid; we should have presented a course of reasoning precisely parallel or similar to that of the advocates of the electro-chemical theory of life. But since art forms these instruments so useful to science and industry, this philosopher, by actual experiment, could be convinced of the error of his hypothesis: not so with the electro-theorists; since, from the constitutional elements of our world, organization and life cannot progress without evolving and manifesting galvanic electricity. It may, however, be replied to them:—if this electricity be the primary cause of organization and life, as they sustain; and, according to their own account, it only emanates in the living economy from *anterior* chemical actions going on in the organs, these actions must *precede* the existence of the *organs*, in order to become their plastic or formative cause. But these actions can only co-exist with the organs and their life, and therefore cannot be the cause of them. Again, since galvanic electricity suffers its state modified or is evolved in all chemical changes; and since these changes take place in dead, as in living bodies, this electricity must progress actively onward after death, and therefore cannot be the cause of life. Indeed, if this marvellous fluid were nature's true vivifier, since it exists in all

bodies in a quiescent or active state, and becomes operative in all their constitutional changes, and in many circumstances, under which they exist, we should think life would not run on, through so many ages, in the dull monotony of the same modal forms.

This fluid manifests itself to be a stimulus of high power, and that energy in living bodies upon which it exerts its force, in place of itself, we may be certain, is the true cause of all the functions. Hence it progresses actively on after death *without life*, because this energy which it excites, is subverted in the last sigh.

From these and many other similar facts which might be adduced in support, the conclusion is irresistible, that in the experiments of Philip, Lavasseur, Edwards, which I have cited, the galvanic fluid acted only as a stimulus upon the nervous or sensorial power, which remained in the organs, whose functions were excited and sustained by it, after the complete division of the nerves. And we may suppose any other stimulus of equal force, if such there be, would, in like manner, excite the vital manifestations.

If the galvanic and nervous fluids be identical, the latter, transferred from living into inorganic bodies, ought to produce in them the galvanic phenomena. We constantly handle and carry about us substances, which are good conductors of this electricity, and we never observe them becoming affected by it. Even by direct and ingenious experiment, M. Pouillet was unable to detect the centripetal and centrifugal galvanic currents, upon which M. Bachoué laid down his theory. The two fluids, therefore, though resembling in their mode of activity, as proved by MM. Reil, Aldani, Humboldt and a host of others, are not identical.

Forlorn! Man, investigating man, occasionally falls in with the route of nature, and catches a glimpse of her ways. He instantly beholds new sciences or new directions in which they must hereafter travel. He is carried away by his enthusiasm, and rears up, without examining all the ground, their ponderous materials; glory inscribes his name;

but posterity coming along afterwards removes all as rubbish. Thus the theory we examine—thus “tout recement,” cried M. Fray, “sans convaincre beaucoup de personnes, q’ il était possible á l’ aide de la chimie de créer des corps vivants.”

If, finally, however, to any extent the functions of life have yielded to chemical explanation, the cause of organization has remained a profound secret, and the views which explain the one ought to account for the other. For, the functions being the acts of the organs, and the final results of all the acts purely vital being the composition and decomposition of living bodies, it follows, that the cause of organization is the cause of the functions.

SECTION II.

THE FABRICATING FORCE IN ALL ANIMATED EXISTENCE ORIGINAL,
DISTINCT.

THE movements and forms this force impresses on matter are peculiar; and, in the manner of action, it differs from all the innate, material forces.

In the molecular changes bodies can undergo by their affinities, we behold a definite series and regular order. The same bases always produce bodies of the same chemical constitution. And, from the order and limited manner, in which the atoms will unite, as proved by the atomic theory now universally received, nature appears to have imposed restraints upon herself in her modification of the corporeal forms. She seems to delight the most in her binary combinations, and displays of her aggregative attractions. Her chemifactions, of which the crystalline bodies are the most perfect models, and in whose production all her art and chemic strength exhaust—classic works—exhibit no variety of internal structure, possess no self-born power of action, run through no regular series of changes, or in an immutable order, evolve other forms like themselves. They respond

actively to none of the exterior forces of the universe. They obey simply their own attractions; and would remain forever stationary, but for the contact of other bodies of antagonizing affinities, which become their spoilers.

Contrarily, the living fabricating force knows no binary compounds, no crystallizing law. It disposes the material elements alone into the ternary or quaternary combinations. Atoms in pairs, of which the chemical attractions are so lavish, do not live; and to attribute the vital forms to their agency, is to go back to the cradle of chemistry, and learn over the first lessons she taught, "that the only difference in all bodies arises from the different manner in which their particles are united."

To the forms of life deriving their origin, at first, from a Divine creation,—which, through the agency of sexes, have been evolved through all times upon the same great primitive models, whose different parts modify and combine to definite results, having relation to themselves and to what is exterior, thus interesting what exists afar in the conditions of their being;—which persevere not by atomic attraction, but by playing in the forces which impel all physical existence;—and which, in the operation of the economy they form, develop intelligence, a new power to help out conservation, there is no likeness or parallel in the rest of things. The impetuosity of evidence proclaims this living substantive force to be the attribute of creation, which, operating as a secondary cause since the first production of lives, has continued to imitate the acts of its Divine Author.

SECTION III.

VASTNESS OF THE ACTION OF THE LIVING FORCE.—LAW OF ECCENTRIC FORMATION.

ALL bodies non-vital constantly feel or exist under the autocracy of the chemical forces. The direct tendency of the vital cause, with whatever nature it may be clothed, is to arrest the action of these forces, undo their work, set out afresh,

and impress on the molecules those varied arrangements and forms suited to its own economy.

When we look at the immense boundaries of the field this cause alone peoples—the great distance which lies between the *conferva*, the cryptogames and the mighty cedar and oak, between the microscopic animalculæ and the gigantic whale and elephant—our intelligence feels all its insignificance, and the frailty of all its knowledge. But when we think of the great number of organs composing any animal; the immense variety of their shapes, structures and properties; the different uses or ends they wisely co-ordinate and subserve, which presuppose in this organizing cause an intimate knowledge of the position, properties and influences of distant worlds, as well as with what immediately concerns the animal itself, we are thrust beyond the temples of our knowledge into the startling presence of the Divinity.

The distinct organic devices, which share among themselves the vital whole of any of the vertebrato-respiratory classes, may amount to many thousands. What prodigious instrumentation! These elements, life's simplest terms, in the denominations of anatomists, group to form fasciculi, organs, apparatuses—the immediate instruments of the functions. These instruments with their composing elements, modify in every link of the whole great length of the zoological chain. The amount of labour, then—the number and variety of forms, this organizing force evolves to impel onward the great orb of life,—transcends all enumeration, all comprehension. Here opens, I may say, the great universe of vitality. Light and shadow hang over and about it. We gaze in its distance till vision is swallowed up of infinity:—field extends beyond field, till curtained in darkness. Yonder white shines life's orient, festooned with purple flowers; its beautiful gates stand always open. Here enter and revolve the ages.

There opens the Tartarean gulf of night, down which they plunge, and stop their noisy flight. Still others crowd the gates and pour on as the restless cataract down the same gulf. This gulf opens below, and they roll on calmly to the

fountain whence they first flowed. How still does life returning approach the Creator, death, the noiseless path that leads to his presence! Against how many rocks and winding shores, O life, do thy mad waters chafe, before they reach below the place of their rest!

So we gaze at the heavens beyond the solar focus. Fields terminate but in other fields gathering darkness. There we behold the arrangements for another economy of existence. Like our own stars, others wander and burn; beyond them others, until the day they shed before our eyes, travels on the other side of intervening darkness.

Not only have the forms of all lives been continually reproduced upon the same primitive types, but likewise each separate organ of every individual. Vital organogeny, so successfully interpreted in our day by Meckel,* Serres,† Geoffroy St. Hilaire,‡ and other illustrious anatomists, shows that one great principle or law of formation answers for, and reigns throughout the whole economy. All the organs are developed from the circumference to the centre. From this law arises the double evolution of each; the extremities unite and form those called *unique*; all the rest composing the animal receive their shapes from the laws of symmetry and conjugation, flowing from the simple one of eccentric formation. All pass through a series of metamorphoses or fugitive shapes to reach the proper or permanent forms. The embryotic shapes of the superior classes, in their progressive evolution, repeat the perfect or permanent ones of the inferior classes; so that those of the superior furnish an explanation for the organogeny of the inferior.

Thus every organ, whether of the worm which crawls, of the eagle delighting in the strength of his pinion, or man in the treasure of his genius, is subjected, so far as its economy reaches, to the same march, and follows the same order of development. "Ainsi les mêmes lois," says M. Serres, "président à la formation de tous les systèmes organiques. Quelque simple que soit un organe, quelque compliqué qu'il vous paraisse, suivez en chez les embryons les diverses

* Anatomie comparée. † Anat. comp. du cerveau. ‡ Anat. philosophique.

métamorphoses, vous le trouverez invariablement assujéti à la même marche, suivant le même ordre dans son développement régulier, et vous présentant dans son développement irrégulier les mêmes déformations.”*

May I say, some of the celestial orbs igniform, shoot along their elliptic paths and return; others, the satellites, revolve round the planets, but, in like manner, one law co-ordinates and explains all their perplexed and complicated motions, and conducts the whole in eternal harmony on the route of nature.

By one law, the law of eccentric evolution, nature is conducting each member of the great living family across the ocean of time. By it she preserves them separate from one another, maintaining identity and perpetual harmony in the living empire. Thus we are assured the men of the actual epoch are the exact copies of those of all antiquity. By this law alone have been preserved the same fragrance of flowers, the spots of the leopard, the color “of the Ethiop’s skin.”—To it the moral and physical wants owe their perpetuation. The goat still crops the hibiscus; the wolf follows the lamb; the shepherd Corydon delights in the smiles of his beautiful Alexis.

The discovery and establishment of this great law with its modifications, which assigns to every structure of animated existences the form and the place it is to occupy in the composition of the living whole,—essence of the divine words, “Let every thing bring forth after its kind,”—have achieved for animal physics, what Newton’s labors did for dynamics. This discovery, in our day as I have said, is due to the efforts of *philosophical anatomy*, so much neglected by my ingenious enterprising countrymen, in the hands of the great men quoted above. In the horizon of the sciences, it has reared up another monument to honor human nature, not less colossal and magnificent, not less beautiful, than the one, on which Newton placed the top stone a little before the last century.

We have seen one law co-ordinates, governs matter in

* Idem Anat. comp.—tome i. p. 35.

space; one law reigns throughout the living empire. Thus the farther truth is pursued, the more the sciences concentrate, the more man draws near the Divinity, whence all truth and science radiate.

I will add: From the obscurity of vegetable vitality, and the difficulty of knowledge from vivisections, vegetable morphogeny does not occupy the same elevated ground in evidence. But from all that is known, from analogy or the fact, that all beings are traversing time by the shortest routes, it must be the same as that of the animal; and all future discovery will tend to the establishment of the identity.

SECTION IV.

ADDRESS OF THE LIVING ARTISAN FORCE.

A THING marvellous! This force not only fabricates the parts of animals fitted to subserve one another, but likewise to modify the qualities and properties of the surrounding bodies, as well as of those which roll in space, and combines the actions and influences of these bodies with those of animal bodies, in the economy they form.

But right here, in the very threshold of this inquiry, are met illustrious philosophers, as Hamberger, Laghi, Georget, and their school, differing, however, much among themselves, who deny altogether the existence of the force of which we speak. These reformers, pruners of what they consider the fungusities of the sciences, banish from medicine all *vital forces, properties, principles, natures*, and regard them as *ontologisms*, spurious entities created by fancy. They found themselves upon the example of Bacon, who discarded in physics all occult causes, properties; and pointed out *observation, experience, and reasoning*, as the only means by which human knowledge is to be perfected. They have attempted for medicine what this great man achieved for general physics.

But can we prudently banish from all the sciences *inscrutable* or *occult* principles, forces? They stand out everywhere

as barriers, beyond which research cannot go, and define the several domains of our knowledge. They form the dark bottom on which it all rests. *The true observation of facts, phenomena of things; the arrangement of their ideas according to the order in which they occur and exist in nature, constitute all good philosophy.* The admission of forces, principles beyond comprehension, *occult*, kept in their right place, does not hinder this arrangement of the ideas of phenomena; and comports well with the limited share of intelligence allotted us.

These philosophers of the *tangible faith*, in their ardor to correct and advance the sciences, have fallen into the error exactly opposite to that from which Bacon drew them, not less detrimental; and merited equally the reproach they lavish, *obscurum exponere per obscurius*.

Banishing a special organizing force, vital properties, a psychological entity, "*Life is only the empty play of the organs, the organism in action; the functions are the organs themselves acting through their proper incitants; perception, volition, reasoning, the passions, are simply, the brain in a state of excitement.*"*

Getting rid of an organizing force, they refer the material composition of living bodies to *physico-chemical principles* not less *occult*. But if it be gratuitous, presumptuous to admit an artisan force as constituting a part in living natures, and a perceiving, thinking entity, distinct from the living structure; what surer, clearer light do we obtain from the statement of the vital phenomena just quoted? and how can we be certain this order is the true order of nature? For, how can we conceive any resemblance, connection between a perception, a thought, and the brain acting, which, in this statement, are convertible terms, or the same identical things? and what union do we behold between the organs operative through their incitants, and the ingenious devices they con-

* La vie n' est que le jeu de ces organes, l' organisme en action :—Les fonctions ne sont que des organes agissant sur ou par l' effect de leurs excitants propres, &c.—Vid. tome i. Georget, De la phys. du syst. p. 45, et sequente supra citato.

stitute? The action of a thing, remarks Lord Kames,* is not any thing different from itself. The psychological phenomena, therefore, or the mind is the brain itself independently of all its actions through the stimulations of its nerves.†—A gloomy idea unnaturally darkening the light of another world. And if we can conceive no connection, union, according to Mr. Hume,‡ there exists none—Conception, fruitful mother, we may suspect of scepticism, to the sciences in the hands of other men.

Under the order of facts this system presents, the light indeed grows dimmer, gloomier. We must admit occult causes. Lobstein, in his study of the great sympathetic nerve, was forced to admit them. The connection in which the phenomena of nature are presented to us, necessitates them. The imperious demands of reason cannot be satisfied till it reaches them, as ultimate, irreducible facts belonging to the same order it has travelled through.

The existence of a living artisan force cannot be fabulous. We observe—the material system, *created first*, appears constituted as if no lives were contemplated to exist afterwards in connection with it. The generality of its forces, laws, is unfavorably disposed, has no relation, or is opposed to such existences.§ Organization could never have been spontaneous. The production of the first living forms was by the Divine Artist; death became the order of nature; a living art-working force could alone arrest, modify these opposing, refractory forces; re-copy the first models which had perished; and transmit them unblemished, according to pre-established order, through the successive ages of the world. But for the establishment of such a force, as we here vindicate, in view of what appears to be the fact, that the laws of matter are instituted exclusively for the good of

* Sketches of the Hist. of Man.

† M. Broussais has recently argued this point with his usual acumen in his physiology. But his reasoning, like all those of his faith, must be considered inconclusive.

‡ Philosoph. Essays, vol. 2d. Idea of necessary connection, p. 59.

§ Brown made life a forced state.

its own system, or are without relation, after the first lives had perished, the subversion of the economy had been inevitable. I will give some examples of the manner of its action.

The rays of light move only in straight lines; and never vary but as the media vary, through which they pass. From this arrangement, vision could never take place. In this law of motion impressed on light, the seeing of animals, as I may say, appears not to have been prospective. But how does the living artisan act to meet this law on its own ground? It fashions and arranges the *media* in the admirable structures of the eye; and thus obtains concentrated light, the thing this law refuses, but which was needed, for the creation of vision.

The artist human rears up his machinery at the foot of the descending water. The power is not sufficient to work it. He obtains the power, the stream refuses, by intercepting and accumulating the passing waters. Observation, experience, and study have taught their lessons; and in them, passed the sceptre over nature, into his hands. We are not surprised. But whence originate this universal foresight, wisdom, skill—this knowledge of the laws of light and the influence of media, according to which, the tissues of the eye are so successfully fashioned?

Again: Respiration is a condition inseparable from all life. By its own weight, as in the first breath, the air would descend, and partially fill the lungs. But there is nothing in it to necessitate its own expulsion. Here this force, always, as we may say, dependent upon its own skill and resources, evolves a variety of structures and powers, which it combines to overcome this weight, and establish respiration in the midst of the opposing forces.

This subject will elsewhere fall to consideration.

SECTION V.

OPINIONS OF THE ANCIENTS ON THE FIRST CAUSE OF LIFE.

THE living structures present exact innumerable relations to the bodies, which exist exteriorly, as well as to the wants of the economy they form. Here indeed would seem emphatically to hold Leibnitz's "pre-established harmony." Here every thing is foreseen and provided for. But did the heart anticipate the hydronamic properties of the blood, it was to circulate, and provide itself with valves; the large trunks of the ascending veins, the gravitating force, and erect their barriers; the ear, the undulating air, and construct its mechanism accordingly; the subcutaneous nerves, the impressions of external bodies they were to receive, and expand their papillæ to augment the force of these impressions?

The ancient philosophers early observed many of these relations, pushed their investigations up to an immovable point in nature, and styled the living body, the *microcosm*. But the great question, I have already made, constantly occurs,—from what deep unseen fountain flow forever this art, wisdom—so full—prescient—so successful, sure in contrivance, which unites the earth with the stars, and constitutes the organs of life their connecting links? It is not chance operating by the same inflexible laws, which has conducted the living forms unchanged through the long and gloomy antiquity they have passed! It is not the divinity now constantly engaged in forming over again, the creatures He has so long since made!!

Here is the end of reason; here dashes the torrent of night! Here the circle of light is bounded by the circle of darkness; where truth, for so many long and dreary ages, has continued to beat up and down, but could never pass, and has remained stationary. Here of old, as intimated, came Orpheus, Parmenides, Gorgias, Milisus, Pythagoras, Empedocles, Prodicus, and a host of the *devanciers*; and, on monuments more

durable than brass, inscribed the impotency of their thought. It was here came Hippocrates, Plato, Aristotle, Democritus, Sextus Empiricus, Asclepiades, Galen—the long caravan of the imitators of Hippocrates, the two extremities resting on remote epochs of time—and all those, who beat the route through of philosophy and physiology till this day, and made a similar inscription varying only a little the words. And the *Demourgon*, the public worker or builder, the *Theion*, without sex, neuter, something goddish, possessing an ineffable nature, the *Enormon*, *Phusis*, *Pneuma*, *Mens agitans molem*, *calidum innatum*, *impetum faciens*, *Soul* of Stalh, *Archeus* of Paracelsus and Vanhelmont, *epigastric forces* of Buffon, Lacaze, Bordeu and Bichat, *Soul* of nature, *plastic Force*, et cet., like the columns of Hercules reared up to mark the world's boundaries, mark those of the mind's investigations of the first cause of life.

Let us, for a moment, examine some of these hard words a little more in detail. Since energy or what causes all motion, revolution, production, strikes the philosophic sense the most, had the speculative ancients known our *gravity*, no doubt it would have constituted the object of their veneration; and, instead of *nature*, *graviture* or some of its synonyms, have come down to us the philosophical Deity primeval. But it was the brilliant flames of the sun and stars, that riveted their contemplations, and kindled in their hearts the ardor of the first religion. Thus all antiquarians assure us, pyrolatry or fire-worship was the original pagan religion, and, consequently, fire held to be the original cause of our existence. According to the philologists, *Nat* in Chaldee means fire, from which comes probably *nascor*, I am born, *natura*, the *phusis* of the Greeks. The Chaldeans and Sabians offered their sacrifices to celestial armies of insufferable brilliancy—the stars—which Orpheus styles “the roving fires above.” They taught, as delivered by Zoroaster, that “all things are the progeny of one fire, which is represented eternal, young, and old, of a spiral shape, and resembling, in the opinion of Tasso, that of the Seraphim as implied in ‘they cast their glittering shields’ ‘or themselves as glitter-

ing shields' at his feet ;"—figure emblematical of God's eternity, and probable prototype of our alphabetical O.

It is certain this doctrine is very old, since it was prohibited by our ancient prophets, who forbid the worship of groves, places favorable to the contemplation of "the hosts of heaven."

The Egyptians in the persons of Osiris and Isis adored the sun and moon. We know the *long-haired, far-shooting* Apollo of the Greeks and Romans, is the same as Osiris ; and that their Vesta is a goddess, who anciently emigrated from Persia, where she received divine honors under the name of Mithra ; and took up her residence in Greece, Italy, and some other countries.

The Stoics erected nature, Vesta or fire into an omnipresent Deity, which continually creates, destroys, and governs. Accordingly, Sextus Empiricus, quoting from Xenophon, thus closes his argument on the first cause.—*Natura nihil sine Deo est, nec Deus sine natura, sed idem est uterque.*

Not only Zeno and his Stoics, but the Peripatetic Aristotle himself, regarded the stars as living, active Divinities. And Lucian triumphantly asks, "what do we seek"—*Superos quid querimus ultra?*

In discussing so far these words, by which physicians of all ages would express the *organizing force* or *first cause of life*, and which generally mean or will resolve into fire, we see our venerable physiology drew its first breath from the first philosophy and religion of men. We still talk of the *sanative power*, the *vis medicatrix*, which evinces, that while the science of living structure itself has made such prodigious progress, on the nature of the vital cause, after three thousand years, we are not in the advance of the adorers of Vesta and Mithra.

Mind, by constant friction, like Niagara's waters in the course of ages, fritters away opposing obstacles ; new routes are beat out, and new sciences are created ; yet its boundaries in nature are prescribed, which, in all its struggles, it can never pass. Early, and apparently with but little effort, it seems to have reached many points of the great boundary

circle; but much peace and prosperity among nations, and great duration of time, will be required, before it covers with solid science, all the ground, for which its forces qualify it.

Hence, while some ideas make rapid progress, others as those we discuss, remain stationary; and bear no fruit to all the labor bestowed upon them. Concerning the great vital cause, we only know now what the ancients knew; and we have seen, their Demourgon, Pneuma, Nature, et cet., is chiefly a conjectural, creating fire, or are only personifications of powers physical, hyperphysical, which can neither be discussed nor rendered intelligible. They saw what has continually since been seen, just what we now see, but reason always enterprising—that fortunate reason which has conducted thought safely into invisible worlds, gained triumphs and treasures—has not been able to stir beyond the twilight of the senses.

SECTION VI.

NECESSITY, IN THE ACTUAL STATE OF THE SCIENCES, OF A NEW AND ENLARGED PHILOSOPHICAL NOMENCLATURE, FOR THE CLASSIFICATION OF THE VITAL FORCE WITH THE OTHER ACTIVE AGENTS OF NATURE.

ALTHOUGH concealed in its nature, we already know, the living force is capable of *subduing* the actions of chemical attraction, and bestowing on the molecules of bodies orders of combination altogether peculiar to itself. And since the bodies it forms, are any thing but homogeneous, it cannot be chemical in the sense of mineral chemistry. It has many things characteristic and peculiar: 1. It differs not only from all the other active forces of nature, in the movements and modifications, it offers to matter, but is capable of becoming quiescent in death, while these forces act onward forever without any intermission. 2. It alone bestows on matter those forms or constitutions, which can develop and excite the activity of intelligence. All the bodies it evolves through the whole zoological calendar,

exhibit shades more or less distinct of this precious quality or nature. 3. It is transmitted from one body to another, by the intervention of sexes. 4. While the other forces display their phenomena in all bodies, it can act only on a definite portion of the terrestrial matter, which appears to have been set apart originally *organifiable*, as proven by the organic detrita not being found below in the primitive formations. 5. According to our sacred philosophy, its activity one day resuscitated, it will gather up all our dust, scattered on both sides of the flood; and present the whole race alive at once, to the hands of the judicative Creator.

Is it spiritual or material? We see everywhere a gradation and variety of the same sort of existence. How infinite are the forms of matter, of minds! For what reason have philosophers limited the Divine creation to the use of only two sorts of natures? May there not exist a gradation of the *entia*, as well as of forms, in nature's great body? The world now being composed of only *two substances*, all its discrepant phenomena are arranged into two great classes, *spiritual* and *material*. May not future research prove this an error, and show many of the phenomena, with which we are familiar, are referable to physical agents, which are neither spiritual nor material; and which form a class of their own?

For the want of such knowledge, actions, properties the most contradictory are attributed to the same agent.—A stone, for instance, drops from a tower, and describes a *straight* line towards the earth's centre. The spaces between us and the fixed stars, are sufficiently roomy for our planets, taking the wrong course, to wander forever. They are guided annually in equable velocity, through nearly the same routes. Their *guide*, so skilful in shaping their course, is *one only* of the *properties* of matter. Since nothing can act but where it is, this property operating at such vast distances, must be supposed to irradiate all over the interstellar spaces, and be omnipresent, yet located in each astral body. But matter is stupid; and we may suppose were each of these great bodies organized and elevated to the state of

intellectual humanity, as the ancient sages taught,* the amount of intelligence thus developed could not do more than we attribute to *senseless* gravity.

The cause, which describes a straight line in the stone, and a curved one in the planets, must be universal. But no solid reason can be given why the stone does not describe some other than a straight line toward the earth. And, if the centrifugal force be an essential property of matter, it ought to manifest its activity in the stone, or the bodies which compose planets, as well as in planets themselves. The force, which sustains all bodies about their periphery, and that which turns them about the sun, cannot be the same.

Here, by a sort of compulsion, we feel, of referring all natural phenomena to either spiritual or material causes, matter, *ubiquitary in its properties*, is made to approach close to some of the *perfections* of the Divinity. One day, truth may admit of a nearer approach; and they may look on us, as we now look on those, who explained so many things by nature's "*abhorrence of a vacuum*."

We know it was once believed there were but four elements. Under better methods of investigation, all these, except one, fire, have been proved to be compound bodies; and the number of elements raised to about fifty-seven. In like manner, hereafter, beings may admit of decomposition; and what we now call spiritual or material, may be shown to belong to a class of existence distinct from them both. Gravity, the polar forces, heat, electricity; galvanism, light, molecular affinity, the organizing energy, may all form, in their substances equally physical, separate classes, as mind and matter now do.

What favors this idea is, in each we observe a marked

* In his book, *De usu partium*, Galen writes,—I Anglicise the passage,—“If, in a being composed of flesh and blood, as man, we admire such a high degree of intelligence, what must this intelligence be in those vast celestial bodies, the stars, the sun and moon?” The same opinion was evidently entertained by Hippocrates, his illustrious prototype, written in the book *De carnibus aut principijs*, in the words of his translator, Et videtur sane mihi id quod calidum, (thermon,) vocamus, immortale esse et cuncta intelligere et videre et scire omnia tum præsentia, tum futura.

peculiarity.—Mind, as I have noticed, displays its phenomena only in organized matter; it is active nowhere else; the vital energy in the acts of organization. Caloric or heat animates all bodies, but offers something peculiar to each, in what is called their *specific capacity*; and in its *latent* and *active* states. Electricity, galvanism, the polar forces, observe laws somewhat similar to caloric, but appear to be more essentially located or resident in certain forms of matter. Molecular affinity has two modes, *attraction* and *repulsion*. The sun is the great treasure of our light and gravity; the former has special manifestations of activity; the latter, though universal in all bodies, is never equal in force in the same quantities, except the distances be equal. These are the *prime forces* which agitate the world, which move in all its revolutions, and are known mostly to be gaseous or tenuous substances. Struck with their essential activity, Newton and Descartes, to account for the action of gravity, filled with such the spaces in heaven.

Already some confusion is being felt, in co-ordinating the great abundance and variety in nature, into only two groups. If gravity, for instance, be an universal, essential property of matter, light, all these prime movers, condemn its laws; and yet the same sciences, which hold these substances *imponderable*, class them with body, although devoid of an *essential constituent*. We may suspect them all to be agents neither *spiritual* nor *corporeal*.

The admission of a greater variety of active natures, would enrich our philosophical nomenclature, and tend to a more luminous order in our ideas. An independent, physical cause for life and mind once generally admitted, good physiologists would directly connect their respective phenomena with these causes. They would no longer refer the acts of intelligence to the brain, nor the composition of living bodies to chemical or physico-chemical principles, in imitation of those who formerly explained the functions by mechanical, hydrostatic laws. Physiology, noble physiology! would then articulate in a clear, intelligible language; and its

history no longer be an everlasting tomb-stone, pointing to the errors and wild aberrations of the human mind.

CHAPTER VI.

ORGANIC, MATERIAL SUBORDINATION OR PHYSICAL CONDITIONS, AND MIND.

GRAT confusion, dissonance, and indecision reign in most all systematic treatises on the mind: never-failing proof, that truth is unsafe, unsettled, out on the field of war; and that the day is to be won, in the great conflict with error.

What is mind? A thousand mingled voices answer; antiquity and modern time, at once, are vocal. You hear it from Meonides, seated with his harp in the bowers of Paradise, singing by the side of the Muses. You are told from the gardens of Tusculum and Stagira; the porch of Zeno: the groves of the Academics; the flowery retreats of Epicurus; from the temples of Vishnu and Menu, Isis and Ozymandias; from the shades of the green oaks of the Druids. Thebes pours it through her hundred gates of bronze; Jerusalem utters its true destiny.

You hear not the same voice, the same thing. They tell you, "we have erected magnificent altars to Truth, dedicated statues, garlands; instituted rights, ceremonies, that she may admit us into her sacred presence. Her temples and worship have stood, while time has wasted." And her instructions are, "The mind is of a most excellent nature, an emanation of the supreme intelligence,—of the eternal circular fire,—which comprehends all things, past as present, and reigns in the Empyræum. It is a spark struck off from this Fire, which mourns its banishment here in the terrestrial prison of the body." "Mind is only a more excellent and subtle form of matter composed of primitive corpuscles." "It is the essence of thinking."

If we subtract what we find in the ancients, on this subject, from the moderns, the remainder will stand in very great disproportion; and more especially so, when we consider the almost sudden explosion of knowledge recently, on every topic interesting to our nature. But we cannot here run all over Greece, Italy, Arabia, India, and Egypt, sketching the great picture of the mind; nor pursue the flight and progress of letters, after they were transferred from the East to the nations of Western Europe, seeking the causes, which have retarded its knowledge.

After this transfer, it is sufficient for us to notice, that a single topic in dialectics, in itself of no consequence,—*whether our complex ideas are real existences or only nominal**—occupied almost exclusively for five hundred years, the human mind. Europe, now the theatre of investigation, Dr. Oudard of Orleans, or the Abbot de St. Martin de Tournay, with his literary chieftains arrayed on the one side; John, Robert of Paris, Ockham or Ocham, Roscelin, Duns Scotus, Albertus Magnus, T. Aquinas,—on the other, tottered, during this long period, the intellectual firmament over the bowed head of all the other sciences.

After the reformation of learning in the hands of Bacon, some solid progress in intellectual physics might have been expected. But philosophers again turned their faces toward Greece, looked for what they could find on this science in Plato, Aristotle, Zeno, Carneades—the great masters and models—took up their route of study, copied from them, or modified their ideas, and presented them in new dress.

Thus they contemplated more the nature of the mind itself, than its phenomena, and the peculiar circumstances under which they are manifested.

The despotism of opinion, therefore, reign of system, natural difficulty of the subject, and illusory methods of research, may be assigned as retarding causes. The latter has, probably, acted much the most powerfully of them all.

* For a historical account of this question, see Hallam's View of the State of Europe during the Mid. Ages.—Vol. iv. p. 385; and Mackintosh's Prog. of Ethical Philos.

Not less agitating than that of the Nominalists and Realists, another question, which marks all philosophico-historic time, comes to torment this study,—*is the mind spiritual or material?* On the one or the other of these views of its nature, all investigation, in all ages, has been instituted and conducted, while the sage precept of Bacon, *Vere scire est per causas scire*, has been unknown or neglected. To minds situated like ours—dependent upon a material mechanism for all its manifestations—this Baconian method of study can alone be natural, and must lead on to success. And we venture to say, had the labors of Descartes, Hobbes, Buffier, Leibnitz, Kant, Spinosà, Hartley, Malebranche, Locke, Condillac, Destutt-Tracy, Berkeley, Hume, Reid, Stewart, Brown,—been conducted on this method, intellectual philosophy, at this day exalted, had enjoyed the public confidence.

A thing unfortunate! The minority, who consider all the mental phenomena will admit of just explanation without the admission of a principle distinct from matter, have been successful, all periods, in exciting to their opposition, the balance, who would think and write. Thus discussion denaturized, has been thrown into the wrong channels to traverse ages, expending its main forces on *spiritualism* and *materialism*,* which, wrought up like *Ætna* and *Vesuvius*, sleep occasionally in the noiseless sweep of time, and then pour out on mankind the uproar of their warring elements. Truth, sensitive truth, affrighted, fled before the eagles of the crest-shaking God, and the thick clouds of Olympic

* The contest for victory between these two hypotheses, a few ages since, rose to its greatest fury. From the violence, and the oddity of the weapons of argument they used, the imagination passèd easily to the combats of Milton's Angels, who,

—“The neighb’ring hills up tore
So hills amid the air encountered hills,
Hurled to and fro with jaculation dire,
That under ground they fought in shade.”

Baxter brought into the field of metaphysics against the school of Barington, the whole artillery of the mathematics, which he considered a most *materialo-perdous* weapon. Vid. his Inquiry into the nature of the human soul—passim.

dust; yet on no subject has philosophy ever wooed her more, or sought her grace. Mankind, I may say, seem born at variance on the nature of the mind; its historic aspect is that of the tented field, for whose arena all ages have furnished armies. The reason is obvious. Men have always felt the deepest interest in a future state of existence. To the receiving of revealed truth they have too often preferred to deduce it from their reason or imagination; religion associated has lent her strong hand, and going beyond herself, not unfrequently administered alone the fuel to keep boiling the hot caldron of war.

In the actual era, mental science is undergoing a decided change. The physiologists have asserted their rights, and claim it as belonging exclusively to their study. They regard all the intellectual acts, as constituting a peculiar order of vital phenomena. Their titles must be indisputable. They, however, contemplate chiefly, only those aspects of the mind, the organic, material mechanism of which is the most manifest, as the various sensations, their influence on the different parts of the living organism, the changes in the order and intensity of the mental phenomena by age, disease. They, therefore, do not occupy the whole field, and appear willing still to abandon the rational or logical mind to the metaphysicians. But if all the mental acts are directly dependent upon the living structure, which can modify them, and which constitutes absolutely the *true measure* of their manifestations, ought not the entire study of the mind be included in physiology, and constitute one of its great divisions? The progress of living thought seems tending this way; many good philosophers have already proclaimed the impossibility, that psychology can ever advance, separated from the knowledge of the living, manifesting structure. It is probable, therefore, mind will cease to form an abstract or absolute science in itself, as it has done; and that the labors of Locke, of all those who have made of it a solitary study, will soon show in the light of posterity, only as literary curiosities.

SECTION I.

THE LAST TERMS TO WHICH WE CAN REDUCE THE IDEA OF THE UNDERSTANDING—DIFFICULTY OF THE SUBJECT—PSYCHOGENY.

LIKE all the other great, active forces, mind has its appropriate place of activity assigned it in the universe. Sheltered from the crude action of external matter, existing, as I may express it, in solitary grandeur in this respect, it operates—*is active*—only through the *intervention* of the living organism. This organism modifies all the material movements without, which are the causes of all its external sensations; and, in the encephalon, offers immediately the conditions of all its other modes of manifestation. This connection and dependence upon the organic laws, through whose efforts it holds intercourse with the external world, elevate it to the great summit, and constitute it the focus of the general action of the whole. Placed in the torrent of the universal forces of the world, and subsisting, as I may say, on nature's whole strength—migratory heir of another life—it was evolved pure and fair at first; was honored at its birth, and bore off the prize, the portrait of the Divinity.

The last terms, therefore, to which we can reduce the idea of intelligence are, 1.—The plastic or organic force clothing matter with new forms and properties amazingly diversified, and peculiar to itself; combining these forms for the achievement of definite ends; compounding further all of them into a whole of reciprocal activity—a living creature—endowed with susceptibilities of being peculiarly affected, and of acting in a specific manner in the presence or through the stimulations of all inorganic, foreign bodies:—2. Matter co-ordinated in space into a system of reciprocal excitement about a common axis, pouring forth a regular series of efforts, which stimulate to activity the new properties or principles of motion originated by organization:—and 3. A spiritual* agent responding to the vital stimulations, whose various reactions are neatly the mind itself.

* We know nothing absolutely of the essence of beings. The names of

Thus movements originating in matter, produce other movements in the organism, which pass to the encephalic focus, and become stamped with the seal of mind; thence they can radiate to the separate organs, and excite them, as in all the wants, and passions; or return again to affect the objects whence they first rose, as in volition. Here, then, is the mysterious circle of action, of antecedence and sequence, of dependence and successive causation, in which are evolved the mental phenomena in the midst of matter and displays of the organic forces. We can plainly behold the circle, but not how the line drawn round, unites at the different points. Deriving the materials of its active being from so many sources, from such distant quarters, how immense is *evolvescent* mind, but not more so, than the transmateral theatre of its future destination!

It is the variety of materials or subordinate agents engaged in its evolution, and the multifariousness of their actions and influences—some creating the conditions indispensable to its activity, others exciting it to effort—which perplex and make its study so difficult. In this circle of immeasurable diameter, of alternate antecedence and sequence, of successive steps toward the physical existence of intelligence, all the phenomena are material or vital, until we arrive at the last series, which only are intellectual. Where, in the circle, is the shadowy boundary between what is purely *material, vital, mental*?

Nature has bound the three in one, great, indissoluble action, as she has done all her other movers, none acting in solitude, but acting only to influence its fellows. See, dark-winged night for ever chases the panting light, the burning axles of Aurora never cooling; merciless winter with icicles, the sweet-breathing, flowery spring; the earth finishing her circle in Aries or Libra, does not stop; the year coming

all language consequently, contrarily to what Hutcheson supposed for the primitive tongue, are not formed expressive of their natures, but only of our manner of seeing them—are arbitrary—and have no real foundations, but what exist in the mind itself contemplating them. *Spiritual* is a *sacred* term, and is warranted.

rapidly pursues the one going; the great cycles of time press on the great cycles; the generations of men and things, after generations. O Nature! where is thy house, thy home; can my eye catch its columnar glory? thy couch, the stilled chamber of thy rest? Where opens the dark abyss below; where terminate the actions and labors of thy great whole? Thy bright years once supple on the azure pinions of solar light; where now shall I behold them outcast, folding up those beauteous pinions for the ivy and the dust? and thy colossal cycles, which so long played in the blaze, and drunk at the solar font, where are they? I behold the architectural monuments of Judea covered with brambles; imperial cities reduced to specks of red dust, which stain the ground in the wilderness; the pyramids and mighty columns of Osymandias scattered in the sands of Egypt, over which they passed; but where is their sepulchre, or lie scattered their huge limbs and mouldering trunks? What am I? how narrow the limits, I can measure in thy great whole! Thy empires stretch away with space; I behold only the shadowy outskirts. I can comprehend neither them, my vital structure, nor sentient mind. I am unknown to myself, beyond the reach of creeping, crawling thought. What am I in thy great whole? that thy God should "be mindful of me," or blood of Heaven be spilt in my behalf; mystery still more mysterious!

In the circle of consecutive movement, we contemplate, we can distinguish some of the actors, trace to a limited extent, and class some of their phenomena; but they will blend shadow with shadow, light with light, color alter color, until the changing aspect recedes beyond our mind's most eager, anxious gaze. We will give an example. The sunbeams paint the image of an object on the retina; but we cannot distinguish between the image and the painting sunbeams. The vital properties present in the eye are solicited to effort by this first process of painting; an impression, certainly not a picture, passes from the eye to the panoptic centre; a new and more extensive series of movements is excited; in these movements, the one begun by the rays

of light, becomes now an intellectual phenomenon or perception.

In this example of psychogeny, the first phenomenon in the series, the picture, is due to the laws purely material, the only agency of the vital laws being the action of the optic muscles, adjusting properly the visual globes. The eye is passive, capable of the same result exercised from the head, and imitable by optic glasses. The impression thus produced in the retina, is transmitted by the optic nerves. So far the progressive movement is regulated by, and wholly due to the vital laws. The encephalon, in its turn solicited, reacts; this reaction still is purely vital, but not the sequence. It has passed over to another order of phenomena; obeys new dynamical laws; can be remembered, compared with its fellow perceptions; aye, falls into new relations with its Creator, "who judges the thoughts," itself a thought.

It passed the line, which separates the two empires, but vision receding in the constantly varying hues was lost. We did not see the gate, which opens and shuts between our mortal and immortal. And, since the vital organs concerned enjoy fully some of the active properties of inorganic matter, which must exert a bearing on their functions, the boundary line, which separates the inorganic and living worlds, over which these phenomena play, is not less obscure than that of life and intelligence.

We see nature combines, multiplies in her action. What at this moment is effect, the next is cause, what was just *corporeal* is now *vital*, the next step, *intellectual*, the product constantly assuming increased volume and variety, until she winds up all as I have said, in one great, universal movement. Here you behold the prints of her footsteps, there the traces are more obscure; yonder they vanish, but she advances on. —Thought, daring, hair-brained thought! pursues her over ground, where the glistening dew-drop hangs unbrushed; writes out, as our systems of philosophy show, long, circumstantial chronicles of her ways, operations, and doings. She comes the critic, judges, disowns, condemns, dashing the unfaithful picture.

O Nature! the fathers of thought worshipped thee an uncreated Divinity. Their children mortalizing thy perfections, have made thee only the linguist of things. The tongues of men are thy continual, familiar habitation. Some boast of having heard thy voice wooing: some, of having seen thee, thou *dark-robed, nimble, light-footed, invisible!* But wast thou there, when Lavoisier undid the water; Cuvier saw thy ways in living organization; Davy let loose thy fires on the tortured alkalis; when Harvey first saw thy tortuous course of the blood, Franklin enticed, and bridled the rude, wild thunder; or when Newton touched thy rolling spheres? Let us rather say, thou hadst been, but wast not there.

CHAPTER VII.

INTELLECTUAL MECHANICS,—OR MANNER OF ACTION OF THE VARIOUS DYNAMICAL FORCES* OF DIFFERENT CLASSES OF PERCEPTIONS AND IDEAS.

WE have just contemplated the excitement or picture painted on the retina; the consequent excitement of the optic nerves, and the cephalic centre. The three differ in their properties and anatomical forms; and the manner of their action consecutive. The rays terminated their career in the retina; the motion they brought underwent, to us, three mutations from the three sorts of properties, and became a perception. None of the three, in the healthy state is capable of originating, in itself, this consecutive movement; they can only transmit it already begun. Light, then, which can alone commence it, is as essential in the production of such mental phenomena, as the brain or any one of the series of actors. We see no proportion between the four

* These terms consecrated to the mathematics are objectionable. But the metaphysicians assure us, the words designative of corporeal existence, furnish all the prototypes of those used to express mental phenomena, and we must be content.

actors, no points of contact; their *dynamia* is a profound secret; we are only conscious of the result.

Let us pursue further the winding course of the sunbeams, in the sequence, after they strike the *rouages* or living wheel-work of the organism. The dynamical properties of perceptions thus produced, and of ideas remembered, are of two orders. In the one, the motive force will display itself on the ideas in the mind modifying them; in the other, on the various tissues and apparatuses of the organism altering their functions. This last order is again divisible, accordingly as the greatest intensity of the action falls on the separate organs. The explosion of this impetuous force on ideas in the mind, on the organic tissues, and consequent movement, are sometimes truly great and wonderful, producing instant death. The susceptibilities of mortals, however, with respect to it, are extremely various.

We will now select objects, the dynamical properties of whose perceptions, will exemplify the two orders of movement, I have mentioned: And first we take one, which has no particular relation to any of our wants and passions. It will manifest movement by attracting the correlative and cotemporary ideas, and traverse all geographical space and annals of time.

SECTION I.

HISTORY—MOTION—OF A PERCEPTION OF THE FIRST DYNAMICAL ORDER.

It is the honeysuckle, I see—wild flower of early spring, breathing delicious fragrance, known to the Muses.

1. I think of my early days, when I was wont to build little green houses in the hedge; the floors I laid with white pebbles; and gathered *these flowers* on the banks of the Saluda to decorate them; that I might attract the birds to come thither, and raise their families, my little friends, in the nests I had constructed.

These reminiscences come not alone; they bring with

them the very life and presence of those, who participated with me these pleasures. The dusky veil of time, wrought with shadows and oblivion, parts asunder.—I behold them. They speak with the voice of other years. “They come rushing by with all their deeds;” like Ossian’s, “the awful faces of other times, looking down from the clouds of ‘Crowly,’ they come.” I contemplate their various fortunes; the different points at which they reached the grave, or the different countries to which they emigrated, scattered forever.

2. Or admiring I gaze on the beauty of the flower. The Bœtian Narcissus, the beautiful boy of fable comes; who, for the folly of his self-admiration, was changed into a flower. I am running over the pretty things said of him by Ovid and Pausanias, when the gay little fellow Astyanax arrests me, and with his mother Andromache, conducts me from the house of Hector, through a private, subterraneous passage, to the gardens of Priam. Hither he was accustomed to urge his mother, that he might gather flowers to propitiate his royal grandfather. The bells are ringing in the palace, for it’s the day a private family dinner is given; and the venerable pair dine with their children. Hector is coming to join his family. Hecuba in maternal dignity is seated at the table. Her beautiful daughters, Ilione, Polyxena, Creusa and Cassandra approach in long robes of flowing white, decorated with transparent shells, emblems of their virgin purity. Their veils of snow, gifts of Cyprian Venus, and touched with the tints of storm-riding Iris, half conceal their faces, and whiten where they come. They enter and join her side. Hipponous, Antiphon, Polytes, Troilus, and Hector occupy the seats. Priam comes smiling to behold his happy family. With the weight of empire, his long hair curls white to grace his shoulders. The little boy Astyanax, in spite of his mother’s reproof, will be near him. He receives his spoiled grandson on his knee.

3. Suddenly another idea comes with fierce, antagonizing force. The thunder of the distant artillery rings in my ear.

I have an engagement to deliver an oration to-day, for it is the fourth of July.

In a moment I am scouring about Boston, in Charlestown, or on the summit of Bunker's hill, amid the fury, the shouts, the tumult of battle, and torrents of flowing blood. The picture—august shades—moving scene of the revolution—is passing before me; while the Tecta alta or lofty houses of Priam, the tasty gardens, and the feast, drop back into oblivion.

But for the artillery, I might have eaten some of the bread of Ceres; tasted the wine, the clustering grapes; and gazed on the lovely Cassandra, born to be the mother of kings. Or I might have been upbraiding the treachery and insidiousness of the Greeks—the cruelty of Agamemnon . . . surveying the great wooden horse within the Trojan walls

the adventurous Helen, borne on the shoulders of Paris swimming across the Hellespont . . .

In these phenomena, we observe the energy of the uplifted wing of human thought; the strong elective attraction of ideas of things, that are, have been, may be; nay, possible to be. We may observe likewise the rapidity of this attraction, which lets the mind through from object to object, existent or non-existent, realizing, feeling by conception all alike.

It is by this attraction, attribute of all ideas, the mind looks on the boundary of space as a very little thing, and on that of time, as nothing; over which it so constantly finds occasion to pass. It is to the activity of this force, subject to be influenced by the will, *which is memory*, all the changes, that occur in our perceived impressions, are due; and from which new ideas arise. Armed with it, our thought holds familiar intercourse, where the day has never shone; or retraces the path, where the noisy wheels of time have rolled, and their lights long extinguished:—plays off its excursions in imitation of that eternal movement, which is to carry it through its Creator's empire.

We have just traced the course and dynamical action of the idea of the honeysuckle let in by vision. By one leap,

we have seen, it carried us back into the first days of our existence, and first theatre of our humble history. Attracted there by the idea of another flower, which bloomed on the land of fable, at another moment, we were transported beyond all history to the age of Narcissus, who escaped sepulture by being changed into a flower. Thence, through the love of flowers contracted by Astyanax, because he found by them he could please his grandfather, we were conducted to the mansion of Hector, the royal gardens, and festive hall of the king of Troy.

Here the movement, excited by the picture of the honeysuckle supposed to be painted on the retina, just as it was striking the great torrent of Homer's song, was suddenly and effectually arrested by another idea darting from memory. The last series of the phenomena of this flower terminated at the table of Priam and his children, where a new direction was given, and a new series begun, which planted our feet, in a moment, with Washington on Bunker's hill.

Excepting the series which brought us to the Revolution, the phenomena with their force, we have contemplated, play off from us into the distance of space and time, scarcely touch the living *wheel-work* at any point, but the encephalon, without whose agency there can be no thought.

SECTION II.

SECOND DYNAMICAL ORDER.

LET us now select objects for perception, the reverse of the one above;—or of the second dynamical order, the action and influence of whose perceptions, will turn back upon us; radiate the living organs, change their rhythm of movement; exalt, depress, annihilate; create pleasure, joy, melancholy, sorrow, grief and death, sudden or lingering.

This order I have said is divisible, accordingly as the action radiates more directly, and expends its main force on particular organs. So great, however, is the facility of transmission, and the unity of all living action, in many

instances, it is difficult to distinguish these organs. Those, which repair the system and supply its wastes; those subjected to the *trisplanchnic* or nervous, ganglionic system of anatomists; and the voluntary muscles, we know, form the principal seats.

This order, therefore, admits of four divisions or sub-orders, which achieve four classes of important indispensable ends in our economy.

1. Conservation by alimentation of food;
2. Conservation by love or re-production;
3. The securing aid from our fellow-creatures;
4. The securing and maintaining our proper relations with the external world. We will give short examples of each.*

EXAMPLE I.

THE object we take is some favorite fruit or article of food—the eye of a person hungry, beholding.

The consecutive action of the illuminating rays passing to the encephalic centre, touch the same points, and are accompanied by the same phenomena, as in the case of the flower. But the perception will not manifest a strong disposition to associate with its fellow ideas; stir about in oblivion; rear up the dilapidated images of things quiet in the great shadow behind us; and soar in the infinite expanse of mind. It will curve, turn back to expend its force on the organism. The effort of the encephalic focus, which, so far as the vital laws are concerned, constitutes it a perception, through the immutable relations or laws food sustains, transmits an excitement to the respective members of the nutritive apparatus. The brain with the spinal marrow, the great main-spring of all the functions, and the nerves, are the media of the transmission of this excitement; and in-

* A monograph written with competent ability, on these two dynamical orders of perceptions and ideas, embracing completely the four subdivisions of the latter, would comprise the complete philosophy of human nature; and be invaluable.

nervation, the manner. Thus the blood is accumulated more or less in each of these members, because the nervous energy or innervation is more active; the sensation of hunger becomes more acute; the salivary, gastric, pancreatic and biliary secretions are poured out abundantly.

Here the object of vision is nutritive. By an inviolable law of creation, the perpetuity of life is connected with food, as the means. The consecutive movement begun in the eyes of the beholder, reaches perception; and by this law is reflected by the brain perceiving through the nerves to the digestive organs, producing in them the conditions necessary to assimilation, or use of the food.

The whole of this series is physiological, except one link, the perception; and the physiology extends much beyond the central organ. Thought is just born, and extinguished; the dynamical property of the perception of food taking this new direction, and expending its force on the assimilating organs. If you say, the food is the appropriate stimulus to induce these preparatory steps to assimilation, it does it, as I have said, through its perception, and that if a man asleep could take nourishment or eat unconsciously, it would do him the same good; it may be replied, the experiment can never be healthfully made, and but for this law, a man or animal would never seek his food or enjoy it, and if food, in the actual presence of the organs excites them, its perception can do the same thing. I may add;—this primary law which co-ordinates the brain thinking,* and the reparatory apparatus into one movement, is the source of the largest half of human and animal industry, and mother of the industrious arts.

* Brain thinking—with us an abridged expression, signifying the invariableness of the antecedence of the cerebral effort to the mental phenomena;—condition in the present order of the world, essential to the active life of our spiritual nature.

EXAMPLE II.

Mechanism of the sentiment of Conservative Love.

MAN, before woman, existed in the earth. Most of the legends of early people, who preserved the recollections of the first events of the world, contain pitiful stories of his sufferings, and the life he led. "A prey to perpetual solitude, dejected and sorrowful, he wandered from place to place inconsolable. He loved and wept, loved tenderly, and yet there existed no visible object of his affection. In his dreams only he saw the image of what he loved; but on waking it would vanish from him. He abandoned himself to ceaseless regrets, and refused all nourishment; until worn down by his sufferings and hardships, he invoked death at the hands of the supreme Numen."

Primeval woman sprung from the heart of man, to which she tends. She was seen, felt, realized there before her birth; or, in the pre-established order of the world, she became a being distinct from him. But it was in the dark shade of embowering trees, where fell the noise of broken waters; amid the frolic of birds and flowers, man first met his companion, and erected his bridal altar. And it is still amid these sweet bright scenes, he is most apt to love. It was in the retreats of wave-sung, blooming Enna, the daughter of Ceres was loved.

In her he felt a new sensation, the sensation of beauty. The consecutive movement falls, and is expended on the organs subjected to the nervous system of nutritive life. It touches the living *wheel-work* at many tender points; but its greatest force is lavished on the tissues consecrated immediately to the maintenance of the race.

At first he saw her only through his mind: he now beholds her through his organization. The light of a higher, brighter world hastens to fall upon her. "Her bosom is the heaving snow;" "she is born of the white foam of the waves." He has been touched by beauty; he lifts his eye to fairer climes than the earth, for the origin of this new

force he has felt. He is humiliated in her presence. His bosom is filled with admiration and homage; she lives in his thought. By an irresistible impulse he is precipitated into her presence; and worships in her an order of excellence* higher than himself.

Thus man adoring is permitted to imitate† the acts of his divine Creator, in the reproduction of a being like himself. Thus nature allures him to live out of his tomb after he is dead; and fling his life to pass on the great torrent of ages.

The gods of antiquity mostly sprung from mortal women. Animated, overpowered by this sense of beauty, men were led to suppose, they had given origin to an immortal race. We know not yet this beauty in its essence and locality, of which woman alone can plant in our bosom the sentiment. It must appertain to the highest order of excellence—an attribute of the Divinity—by which He perpetuates a race, the individuals of which, He has doomed to perish.

Many philosophers have satisfied themselves that they have profounded the origin of the sentiment of beauty. But a meditated examination of their labors must fail of conviction. Count Buffon, who regarded man and woman as forming but one being in the hands of nature, struck with the mysteriousness, created for its perception a sixth sense. His genius permitted him to see nature with new eyes, but this *peculiar sense* is as obscure as the thing it was intended to explain.

Abelard, Tasso, Petrarch,—loved till the end of their days those who first inspired them with this sense of beauty; and loved them only. Is the object of nature—the end of beauty—to annihilate the personal identity of two individuals of different sex, and secure their solitary union for life? The

* Paracelsus—Pope—have left monuments of their hatred to women. They could not behold them through this nervous mirror of nutritive life, *abnormal, untrue* in them to nature.

† If, according to the Orphic verses, *love* or the *beauty of the divine ideas*, which struck Plato, was the first principle of all things, it is love, we see, in mortal bosoms, which still originates fresh life, is the prime mov —great main-spring of ages.

facts librate for and against it. Our sacred books make it a duty. Plato,* Miss Mary Wollstonecraft,† M. Virey,‡ admit there is a polygamy of nature.

EXAMPLE III.

The object is an amiable female in distress.

SHE has just been shipwrecked in her affections—the three-fourths of the being of her sex. The ebon hues of her pendent veil, the deep black drapery of her sorrow, give a hallowed and unearthly aspect to the faded snow of life. Her dress answers to the dark clouds, which hang on her futurity, and to the complexion of her soul, which forced out of life, has taken refuge in the tomb. Her figure a little inclined forward, her march is slow and steady. It is “the narrow house” covered by the shade of some elms and branching oaks; when twilight is stealing abroad, she approaches alone. Her gait grows unsteady—she totters—advances—stops—advances again. Deep irrepressible sighs murmur up from her broken keart; respiration grows convulsive; she falls in incipient death near the holy spot. As on the grass, the dew-drops gather on her locks to trace now the cold paths of her exhausted tears; and her soul visits, for a time, the dear, dreamy land whence her love is gone.

The brain perceiving such an object, will transmit the secondary or consecutive movement to the organs under the same nervous dependence as in the two last examples. But this movement will fall with the heaviest weight on very different tissues; those of the thorax and abdomen will constitute essentially the operative theatre. We know this only as an irreducible fact of our nature, understood by those even who lived early enough to frame language—by all antiquity—and maintained by a host of modern philosophers.

* Republic.

† Vindication of the Rights of Woman.

‡ Histoire Naturelle du Genre Humain; et Dic. des Scien. Méd, art. Polygamie.

If the active theatre of the three movements be different, the phenomena are different. The normal excitement, in the first case, where the object was nutritive, in all its tendencies, is to the conservation of individual life; in the second, to that of the life of the species; but in this third, it is directly to its destruction. The phenomena of the two first are purely physiological; of the third, essentially pathological.

We know the nervous tissue, in its various forms, is the starting point of all living actions, and the agent, which sustains, and combines them in the different apparatuses of the economy.—That the *nervous power* illy definable, is the universal stimulus to the excitability of all the voluntary muscles—and that in the senses, and all the nerves of relation, it is itself, which is excited. It is, therefore, both the *excitants* and the *excitatum*. The share of action, and the reciprocal influence of the different members of the nervous system, as in the actions of the heart, arteries, capillaries, &c., since the days of Gorter, Haller, Whyt, till Dr. M. Hall, and the vivisectionists of our day, have continued to excite the profoundest interest and research. The recent labors of Bell, Lobstein,—have achieved something to advance our knowledge in psychologic neurology. But the heaviest shades still hang between our intellectual and pathetic natures, and obstruct the view.

By the one part of this system, we hold communion with the world, and live out of ourselves; by the other, the relations and influences of its various objects are peculiarly impressed upon us. It is through the triform ganglionic portion of this system, that the seal of our humanity is stamped upon us. It is through it alone we feel the ardor of religious devotion, pleasure, sorrow.—But for it, it never could have been said,

Non ignara mali miseris succurere disco;

nor as the early poets sung, had Niobe been converted into a stone through sorrow, from the loss of her children.

Mankind have honored, done homage to the inspirations of this ganglionic sense; and those, who have disobeyed,

been held as monsters. Cabanis the first gave to it the most beautiful development.* It is by its charming light, we behold the interesting, lovely object now before us—dilapidated—fallen in ruin untimely amid the rosy hours of her reasonable hopes. Her innocent heart was filled with the tender images of love; her futurity was full of flowers. They have suddenly been torn from her. Is there a tear, this movement of which I speak will find it; a cup in us to hold sorrow, it will fill it.

The reflected action of the encephalon, I have said, will fall on the thoracic and abdominal organs or *phrenic centre*. Hence the venerable expressions, "*bowels of mercy—compassion*." From this centre, with different degrees of force, it radiates to affect the other parts of the organism. The two parts of the nervous system communicate at different points. Prochaska sustained, that the passions act on the heart through the eighth pair of nerves. But the manner of achievement of the law, which co-ordinates the brain perceiving, and the phrenic centre into one action, must be conjectural, since the light does not shine so far. It is not improbable, the brain's reflected movement reaches the instrument of the ganglionic sense, at more points than one. If, therefore, the brain must be affected for the mind's perception of an external object, the ganglionic nerves must likewise be affected, for its perception in the light of the passions. The passions or mental phenomena of the ganglionic sense, accordingly, are more complicated than those of the external senses. If a man could subsist without this internal nervous system, all external objects were to him alike. He could neither know joy nor sorrow, love nor hatred, more than one born blind, does colors. For it is through this second sense alone, the mind feels the qualities of the objects.

But if this movement, reflected to the phrenic centre, produces the passions, the reaction of this centre on the brain, gives birth to all the delicious images, touching beautiful ideas of poetry, eloquence. Vauvenargues is right; "our

* Rapports du phys. et mor. de l' homme.

great thoughts come from the heart." To augment the intensity, animate this phrenic reaction, Apollo came forth with his lyre; the fountain of Pindus flowed; the waters of Helicon broke forth from the Boëtian mount; the Muses were born on the *serene top* of Pierus; loved to walk in the Olympic blue; to wander through solitudes over woodlands, and Idalian groves, that they might catch what was soft and moving in nature, and fire mortal bosoms with the harmony of numbers.

It is from this phrenic reaction, then, flows the deep fountain of all our moral nature. It is through it immediately, we feel pity; our tears flow at the sight of flowing tears;—that we participate in all the feelings of the dear, mournful object, we have here selected for an example.—She advances slowly; we feel inclined to the same movement. Great debility marks each footstep; the same debility seizes upon us. She swoons near the grave of her lost spouse; our respiration grows impeded.

The phrenic reaction expanding, reaches the nerves presiding over the nutrition of the eyes and complimentary organs. It excites the supplying arteries; the blood flows in increased quantity; the eyes redden; the stimulated lachrymal glands pour out the tears. In the same manner, the blood is accumulated in the head, the thoracic, and abdominal viscera. The brain throbs; weight or pressure more or less great is felt in the epigastric region, arising, probably, from capillary stasis, and the peculiar sense of trisplanchnic nerves. From their weakened or unduly stimulated nerves, the intercostal muscles take on convulsive movements; the diaphragm heaves; respiration tends to impracticable. The heart participates lively in the great sphere of this disturbed ganglionic excitement; vibrates and impels the blood irregularly and with difficulty.

GENERAL PHENOMENA. The skin has grown cooler; there is more or less chill; the general circulation has become slower. The voluntary muscles are weakened; the supply of nervous power has diminished. The appetite for food is lost; the function of nutrition has given way. The mind

is more or less insensible to surrounding objects, is absorbed in one subject; the psychological functions are abnormal. The hands and feet are cold, but the head, eyes, hot; the *epigastrium* heavy and labouring, the thorax heaving, and the heart palpitating: there is derivation of the organic functions, showing where the blood and nervous energies are gone in excess. It is the brain, and the organs subjected to trisplanchnic animation, but especially those of the *epigastrium* and thorax, where the greatest intensity* of the action is going on, and sustained there by an accumulation of life's prime movers.

Thus the encephalon affected for the perception of a *single object*, reverberates the perceptive movement to the nutritive nerves; they radiate it through the organs over which they preside; the two portions of the nervous system respond energetically to each other. A storm rises in the living functions. How rapidly does it turn some pieces of our mortal machinery, how slow others!

Of the law, which co-ordinates into one movement, the two portions of the great nervous system, *the conjoint acts of which we call the passions*,† I will offer some reflections as to the

FINAL CAUSES.

The active tendency, I have said, is unto death. In the writings of those who have recorded the moral and medical history of nations, the history of great pestilences, we see,

* No wonder Lacaze, Bordeu, Bichat,—located the seat of the affections in the *epigastric*, more properly, *phrenic* centre, which many sages have regarded as “the immediate habitation of the soul.” So conspicuously, sensibly is this centre affected, in all the pathetic movements, that all antiquity, as I have said, was full of this idea. The divine philosophers made it synonymous with the understanding. “The heart,” says Job, “conceiveth mischief.”

The error of the physiology of Bichat and those like him is, that they made the *acts* of this centre, the *passions* themselves, as they did *those* of the brain, the immediate *mental phenomena*, both being efforts purely of the material organization. They left out the mind.

† So far as the material organs are concerned.

to the affections, nay, to a single thought, thousands have fallen victims. At the moment his ideas were publishing to the world, a copy was brought to Copernicus; he pressed his immortal work to his bosom, and expired. The lover dies for joy leading his bride to the altar; the culprit, on receiving his reprieve. "In this scourge from God to man, which threatened to destroy the whole human race," remarks Diemerbroek,* "many perished without being touched by the disease." Friend† has recorded a great variety of similar cases. One dies from fear, another from vexation.

Like malaria, contagion, the variolous matter, war without the sword, national calamities, private misfortunes, are known to be energetic consumers of human life. The revolution and convulsions in France, of which Marmontel has drawn so animated a picture—those days so calamitous to the French, states M. Corvisart,‡ "have furnished ample proof of the influence of the passions in exciting organic diseases in general, and those of the heart in particular." Vast numbers died suddenly from apprehension; others perished lingeringly. The national amphitheatre of dissection showed they had expired from aneurisms or ruptures of the heart, heart-broken, among whom females outnumbered far.

But the question before us to solve is—*because I am sorrowful, why do you feel sorrow?* The direct tendency of the law is, to multiply the sorrow by combining or drawing others into the sphere of its influence and action. It is the essence of all philanthropy. It is the august voice of nature, rather of her Creator in man crying for help; and gives the true meaning to the words,—"*For I was an hungered, and ye gave me meat: I was thirsty, and ye gave me drink: I was a stranger, and ye took me in: naked, and ye clothed me: I was sick, and ye visited me: I was in prison, and ye came unto me.*"§

It is made one of the hinges, upon which the door opens

* Treatise on the Plague.

† History of Medicine.

‡ Treatise on the Organic Lesions of the Heart, p. 323.

§ St. Matthew—chap. 25, verse 35 et sequente.

or shuts upon the magnificent presents—lofty decorations—of the transtemporal life. It regards “a cup of cold water,” as a gift more splendid, than the crowns and sceptres of sovereigns:—is the light that burns in the most transcendental, sublime expression, *sum homo*.

Howard,—the philanthropists,—made of it a practical science. The Cynic philosophers among the ancients; Hobbes,* Bentham† and his *utilitarians* among the moderns, disregarded its sanctions. Nero, Domitian, Caligula, Robespierre, *hyena-shaped*, put it under their feet. Jesus Christ engraved it on the crimson escutcheon of his religion, while the high tops of Asia shook, amid the thick gloom of preternatural darkness.

Man was not formed independent of his fellows. This law of our organism, I have before said, commands, secures their assistance. Much more dependent is he upon his Creator. Through it likewise he feels he needs the divine aid; religion becomes an imperious want. And the proudest monuments of his architectural skill, in countries he has left, and where he dwells, are the temples he has raised to gratify this want.

EXAMPLE IV.

Hector dragging at the war-chariot of Achilles,—Andromache, the beholder.

The mechanism, the scene of the fervid vital action, are precisely the same as the last. The only difference is, in the suddenness, and greater violence of the movement.

When the catastrophe happened, Andromache was engaged in an upper apartment of the palace. She was gay—decorated with the beautiful bridal veil of Venus; network of filleted gold graced the tasty ringlets of her hair. She did not know her husband had gone alone beyond the gates of Ilium; had an interview, been duped by the deceitful, ‘*azure-eyed*’ Pallas; or exposed to the combat of Achilles.

* Human nature, et De corpore politico.

† Treatise on Morals and Legislation.

Expecting his return from among his warriors, she had just ordered for him a warm bath.

Suddenly, the ululation, the wild cry of sorrow, is heard from the tower, where the scene going on, is visible. It is the voice of Hector's mother; and she says,

—"I have heard the voice,—my rebounding heart chokes me, and I seem fettered by a frost." She flies to the tower to ascertain the cause of the rupture; and beholds her murdered Hector dragging at the rapid chariot—

"Inveiled in sudden darkness, with a sigh,
That seemed life's latest gasp, supine she fell."

Here the vehement force of the consecutive movement of perception, and of the phrenic reaction, stuns, paralyzes, in place of exciting, the responding organs, and there is syncope—*bouleversement* of all the functions.

Some relaxation occurs; she mutters delirium, the voluntary muscles contract spasmodically, drawing up her icy fingers. Again she asphyxies, but recovering a little, beholds naught but black, *open-throated* horror, and a wide world made empty, and hideous, by having lost its only luminary. Her laboring soul, pressed hard at every point, vibrates rapidly between the dark shadow of death, and the still darker one of her own future existence.

The stunned organs within the sphere of the double focus of this movement, the mechanism of which was described in the last case, recover a little; the organism, by a law of living nature, relaxes, and the brain is able to manifest imperfectly some of the intellectual phenomena. Thought dawns, and with it comes the idea of Hector. The repercussive phrenic reaction repeats on the brain and the other organs its hard blow; again she falls back into darkness; and in annihilation tastes some repose from the *tiger-fanged* thought of her misfortune.

So the high-topt Indiaman, freighted at Arabia's fragrant shores, ploughs its broad furrow through the smooth sea. The storm comes, lifts up the huge waves, and buries it beneath. Its noble form mounts up, and rides along their

tops. But again it sinks between, and plunges the black gulf of night.

At length the intensity of the action gives way; and her reason occasionally interrupted, returns, but not soon her health.

“An instrument that’s tuned so fair and sweet; the chords once broke, not quickly will regain its just accord.” The organs of the *triped* life, as M. Duges calls them, all exhausted; and their tone lost from over exertion, rather over excitement without exertion, the congestions, organic lesions remain obstinate in some, and the debility in all. Anôrexia, and wasting atrophy, come on. This leaning so admirably described by Bichat, often continues until the sufferer is threatened by protracted death. All the movements are slow; the pulse feeble, the voice low and scarcely audible, the mind incapable of a vivid conception, except the one of its sorrow.

Thus nature always kind, by letting down the forces to weaken the mind’s energy, screens from excessive sorrow; and from the cup of time and oblivion—the slow winding stream of Lethe—pours in consolation, snatching the victim from inevitable destruction. In this way the tender-hearted Andromache recovered;* for she was found among the noble spoils of Ilium, to be divided among the Grecian lords, and fell to the lot of Neoptolemus.

EXAMPLE V.

Leander drowning—Hero.

Hero entertained for Leander the most ardent, devoted attachment. She was waiting for him to cross a piece of

* But sometimes, as remarked by Percival,* Chrichton,† Arnold,‡ all the writers on *vesania*, the lesion of the brain remains permanent; the other organs recover, and the insanity continues for life. How furiously the mind can destroy!

* Annals of Insanity.

† Mental derangement.

‡ On insanity—curious commentaries on human nature.

water, which lay between them, when suddenly she saw him drown. In one loud—long—shriek she expired instantly.*

Like the vivid thunder-bolt, the explosion of the phrenic reaction, in this case, on the brain, and other organs, destroyed life without producing any organic excitement.

Not only that the painful but likewise the pleasurable and other emotions will kill, history is replete with examples. Pliny relates, that the philosopher Chrysippus and Zeuxis expired of pure pleasure. Every one remembers the fate of the latter. He painted a very ugly old gossip, who monomaniacally esteemed herself a most surprising beauty; and took the greatest pleasure in drawing upon herself admiration and gallantry. He died at once, laughing at the picture.

Plutarch† makes mention of a lady, who was suddenly killed by the sight of some flowers.

The victorious Diognetes was camped before the gates of her city. Polycrete, endowed with eloquence and a most subduing beauty, was commissioned to approach the tent of the proud warrior to sue for peace. She succeeded; and, on her return discovered her path was strewn with flowers. Her joy instantly broke the fragile cup of her being.

Recorded in the life and monuments of our Savior, what Christian, but could envy Simeon's death, of eternal remembrance?

REFLECTIONS.

In modifying the mind itself and the organic functions, these examples manifest, the dynamical force and activity of perceptions, ideas, to be very various. They show that the nervous organ of nutritive life or phrenic centre, is the throne of the *pathetic*, as the encephalic focus is, of the *intellectual* phenomena. That when the mind sees an external object singly through this focus, the perception bears no impress of the passions; but when it beholds the same object again through this phrenic centre, the perception

* Dannet's Greek and Roman Antiquities.

† De virtutibus mulierum.

becomes stamped with all the characteristics of the passions. Thus a slight injury is offered us. At first we do not feel it an injury. Afterwards it is perceived through this centre or nervous focus of nutrition of life, and our anger is kindled. Or, as in the case given; the lover may not love, or feel the sensation of beauty, the first time he beheld the object of his passion.

That through this dynamical property or attractility of ideas, a single object, as the honeysuckle flower, passed the material conditions and become a sensation, like the Boreal light, may stream down the dark field of memory, carrying with it a truly revivifying, resurrective energy. Recollections, which had long slept forgotten, shake loose from the dust, rise to join, and become active in its moving train. If the mind have devoted its days to successful study, such an idea may light up the whole empire of oblivion—pass over the long, hard struggles, mind waged with nature, to produce civilization through the invention of arts. Successive creations, convulsions, destructions of things, people, cities, kingdoms; arts, philosophy, institutions, sciences, manners, customs, morals, religions, languages, lost in the ravages of war, modified in the conquest and affiliation of nations—monuments of history, man and his works—all hid alike in the great sepulchre of time, will retaste being, stand up erect as they once were, and live before it.

It is this energetically active force of ideas, which conducts the orator on the route of discussion. Soon the *phrenic* fire presses steadily his brain, and touches his soul with magic, stimulating the activity of this force. New and unexpected fields of thought suddenly expand before him, rich in flowers and sunshine. The cold written form of expression drops from his hands. He plunges the tumultuous, burning gulf, into which his mind has been shaped; “the listening senate drags at his heels,” adoring assemblies start affrighted from their seats, or dissolved, pour out their tears.

Under this rapid stimulation, his brain soon tires, and is exhausted. If he knew not, before he rose, what he might

say, he cannot now repeat or feel or know what he has just spoken. He has been caught up, as by supernatural power, to figure for a moment in another sphere, from which he has been cast down as in mockery.

It is this force thus stimulated, which enchants the islands of the sea, the scenes of woodland shade, of craggy, frowning rocks, the tombs, palaces and castles of the dead; and all antiquity giving to them the tender look. It is it, which brings within the horizon "the gorgeous palaces and cloud-capt towers,"—it, which causes,

"The poet's eye, in a fine frenzy rolling,
 'To' glance from heav'n to earth, from earth to heaven,
 And as imagination bodies forth
 The forms of things unknown, the poet's pen
 'Turn' them to shape, and 'give'* to airy nothing
 A local habitation and a name."

We know that solitudes, high elevations favor the displays of this force. Hence, we may suppose, the philosophical ancients located the birth-place of the Muses on the top of mountains; and bestowed on Apollo and Hercules, the name of Musagetes, who led them forth.

Under the name of "association of ideas," Dr. Hartley made it one of the bases of his *vibratuncularism*. Vibration, he supposed for the nerves in sensation, the other base, he took from Newton, who conceived the rays of light vibrated on their near approach to objects. With Brown it is *suggestion simple* and *relative*.

EXAMPLE VI.

Besides the alimentary tissues, all those composing the phrenic focus—or the various organs immediately under trisplanchnic animation—there are others, on which the secondary, perceptive movement directly falls, and expends its energy. These are all the voluntary muscles. Man—all animated beings live in their unremitted reaction on their

* To suit the course of thought here, may I be forgiven the sin of having offered change to these three words, of what is inimitable, immortal.

world. This class of movements comprehends the fourth subdivision of the second dynamical order of the distribution laid down above; and as I have said, secures and maintains this ceaseless, conservative reaction.

No being of nature, we have seen, puts forth its acts in solitude, but all combine to a general effort. In this reaction, it is the mind, which places the organism in the great circle of the social movement. But we cannot understand, how the mind, without weight or extension, can move the solid extended organs—or how our immaterial can excite motion in our material. We only know that mind and matter are the same thing in origin—descended alike from the same spiritual, eternal Nature; and may suspect our distinctions to depend much more upon our incorrigible ignorance, than upon their difference. We know nothing of the direct action of mind on inanimate bodies. Such appears to form no order of nature to illuminate us. We only know organic, living bodies, as the sole medium of reciprocal activity between the two. Mind can simply excite motion in the matter of living organs, which is transmitted; and in turn, is excited by the action of external matter upon these organs.

M. Cuvier, with many others, conceived this motion of volition to be attended by chemical phenomena—something like the explosion of phlogisticating gases in the muscles on their decurtation. We are also ignorant of the nature of this vitalo-mental movement. But we must not anticipate here what will more properly come before us in a future part of our work, where sensation and the intellectual faculties will claim attention.

In the first infancy, the voluntary muscles are but little under the autocracy of the will. They need much training, or in the language of M. Bichat, to be “educated,” before they obey promptly its stimulations. The consecutive movement of perception upon them, consequently, is nothing at first.

According to Mr. Hobbes, all these acts have their origin in the passions, or “the imagination is the first internal

beginning of all voluntary motion.”* No doubt a vast number of them, which give to human life so many colorings, are reflected through the phrenic sense, before they stimulate the organs. Cæsar reached forth his hands, at the public festival of the Romans, to receive the flower-covered diadem presented him; for, like Pompey his rival, he desired the sovereignty of the world. And it was the fear of the people, that made him again lay it down. But certainly the repeated blows of the axe-man, the motions of the laborer, innumerable acts we constantly perform, have nothing to do with the passions. The consecutive movement of perception, passes directly to the voluntary muscles, and stimulates their activity.

Nature has made this sort of perceptions the most numerous, because the most useful. Millions of them pass without exciting any motion; but when they do, they all directly or indirectly, expend the sensorial power on the voluntary muscles; organs whose excitements are infinitely less lethal, than those of ganglionic life.† It was the force of this sort of perceptions, when the earth was but one wilderness, that commanded room for the cultivated field, and the reign of Ceres; became the mother of cities; and, in its exercise, is the fulfilment of the Divine statute, “by the sweat of thy brow, thou shalt eat bread all the days of thy life.”

The modifications the objects of these perceptions may produce in us and animals, decide the direction of the ulterior movement. Is the tendency to conservation and enjoyment—to the *jucundum*, the entire motion is a complete circle. The direction will be to end in the object—*approximation*. Is the tendency to the reverse, or to the *turpe* of the ancient schools, the circle will be broken, and the ulterior movement take a tangential direction—*repulsion*. Here

* Works, p. 116.

† We have seen the influence of the passions. Tissot, in his *Traité de la santé des gens de lettres*, mentions a great number of cases of injury from them. One, among others, is that of the celebrated Malebranche, who was struck with lively and violent palpitations of the heart, on reading Descartes' *Traité de l'homme*.

the secondary, perceptive movement is reflected through the ganglionic sense—mirror of nutritive life—which greatly augments its stimulating power on the achieving muscles. Thus nature multiplies her forces on the organs, which put us in relation with the external world.

We have endeavored here to exhibit simply the manner in which nature brings forward the mind, places it down by the side of her other great actors, and presents it in the moving spectacle of the world. In the next book, as noticed, it will find its place for consideration in its other relations.

BOOK II.

BEINGS—THEIR RELATIONS TO THE DOUBLE EXTENSION OF TIME
AND SPACE.

IN the first part of this work, we have considered three great active forces—or three sorts of being, *matter*, *life* and *intelligence*, which with their properties and displaying phenomena, constitute *nature*, and the Being primeval, in reaching whom reason investigating them, terminates its flight. In this second book, into which our work is divided, we are to contemplate them in relation to the double extension of time and space. We shall behold them exert their properties for productiveness, unfold their cosmic phenomena, and pass through their revolutions. This sort of contemplation will tend much to the historical; and we shall pursue the same order in descantation, as we have done in the preceding book. It is obvious, our manner of writing being sketches, permits us only to touch, but not exhaust the topics over which we pass.

CHAPTER I.

THE HISTORICAL CREATOR, OR AN ACTIVE, DIVINE PROVIDENCE.

IMPETURBABLE in their great dynamic balance, the spheres above, to mortals, turn softly on their axes. They appear and disappear without change; fall not in their course “into the yellow leaf,” but persevere the same in an eternal quiet. On the earth force rebels against force; and there ensues disastrous change. The slightest observation of the earth’s arrangement—its moist body enveloped in a dense elastic fluid—evinces it never was formed for tranquillity. Under such physical arrangement, force can never

long hold force in equipoise. In the triumph of the one over the other there must be ceaseless revolution.

On its broad surface are spread the sentient races. They only appreciate existence, enjoy nature, and feel the changes without. How invaluable, precious is this surface! Making more room here, yonder the mountain lifts its lapideous head threatening the way of the stars; vegetable life beautifying, ascends near as it dare the frozen roof of heaven. Here the valley forming, sweeps out undulating into the extended plain to reach the sea. Yonder sweet in moonlight lies the lake, vehicle of national intercourse and convenience. Here winds the stream, noisy with wave and singing bird. Yonder the leafy tree struggles with the passing zephyr. Here the wide meadow mocks the sea-waves. Yonder the burning sun engenders thirst; here opens the rock, mother of cool waters.

These are the houses—homes—of the living, built when nature was young. Mountains are the partition walls; oceans, the separating ditches; Heaven, the common roof. Here pass their ages.

1. All invite from nonentity; the beauty and ornaments of existence seem pledged. Zephyrus bursts from the chambers of Ausonia, and flies on purple wings. The course of light is lengthening; and the vernal Aurora is lashing her foaming steeds up the steep East. The rapid wheels inflame the steady axles. They dart their reddening fires, and dye deep the clouds. Her radiant wheels fly through the Orient gates, and burn the dew-drops, little images of themselves, the stars now taking their rest in their hid chambers, had hung to clustering flowers.

Yesterday her chariot passed in safety, the day before, and still the day before, and still—raining down naught but life, and the tranquillity of enjoyment. But to-day unportended, nay, portended contrarily, before it reached heaven's high top, it struck suddenly the black gulf of night misplaced, the throne of light usurped, and was lost. As some triple-fanged, starving monster, whose chain had been suddenly cut loose in heaven, the tempest came, shaking the

earth, sweet with flowers and soft in promise, with his sinewy arm and noisy breath, as if to devour;—pouring from his throat the scathing fire and globular ice;—and swept into one smooth nonentity, the toil and care and hope of time, held by a *magna charta*, not extorted but freely given, now violated.

2. At the foot of some mountain, whose hideous and deformed top is deceitfully veiled in the clouds, the plain slopes beautifully to the sea, nourishing mother of trade. Indicating great fertility of soil, the *conifera*, the *magnolia*, lift high their heads, and unfold the rich treasure of their foliage. No one dreams their deep roots cluster about the ivory and gold, which ornamented a throne, drink in the coffins of a suddenly destroyed people, and unfold ambrosial fragrance, loveliness and beauty.

Clad in the skins of wild beasts and half starved, some nomadic tribe roaming the earth for sustenance and accommodation, seduced by the beauty and fertility of the spot, plant deep their tent-posts, and dwell in a fixed habitation. Food and clothing multiply upon their industry; and they soon expand into a great nation, holding all the adjacent country.

They build a city; establish legislative halls, and seats of public justice. Law moulds society into an energetic body; and gives to individual life its just weight and value in the organized whole. The earth now feels the pressure of a regular and systematic cultivation. The industrious arts are born; and a superfluity of articles created for exchange. The white sail carries them to distant shores; and they bring home other commodities created by the taste and ingenuity of other people, or refused to their own soil. Elegance and luxury are born.

The streets are extended to the water's edge to receive the freighted ships; and the city grows in its strength. Enveloped in radiant clouds of gold, a lovely, smiling form descends. It is the genius of poetry and the fine arts, descended in the person of Minerva. Now they worry the spotted marble, and fret the roof of heaven with magnificent

edifices. They ornament them with precious stuffs, and worship the Gods they brought with them from their native land. They rear up *mausolea* to protect the ashes of the honored dead; with the harp sound their praises; and by statues perpetuate eternal remembrances. Of brass or adamant, in the midst of the city, they lift to heaven, against the friction of time, the monumental column, on which are to be inscribed the name of the country they left, of the tribe from which they are descended; the day and epoch they pitched their tents to build the city; the names of the founder, the reigning monarch.

Contemplative men put together the observations of time; the laws of nature are discovered; philosophy is born to illuminate the arts, and push them forward. The means augment, the population still advances. Their country's banner floats smoothly on the wave, and is respected. The proud eagles of Jove perch on it, threatening protection. The fair city increases in the richness of its stores, and magnificence. Human beauty remodeled, flits along the streets in jeweled robes—*lovely symbols—letters*,—in which history reads the progress of arts and civilization. It is only now a legend, that their ancient mothers tore from the trembling limbs of furious beasts overtaken in the dark morass, the warm skin for a covering; carried burthens; and performed menial service.

The course of time is regular; has been so for centuries. His chariot in which Fate rides compassionately, returns with naught but good—good, pledged and sanctioned by the laws which regulate the gray hairs of things—good, halloved and made venerable by age—procured at first, and sanctioned by these laws, on whose sacred and veracious fidelity all human prospective efforts are predicated.

Their fathers passed in the ordinary tide, which sweeps away things. They went full of enjoyment and ripe to the long rest of the mortuary. Time forgotten, they heard the sound, the voice of the mountain. But it was not spoken to them; it was a dozing utterance to the passing moon.

Like the days passed, prosperity and gaiety flow on in

full tide. The lamps planted along the streets, pour on the nights an artificial day. They listen to the flute or shrill timbrel, the wine darting its fires along their veins; and fall asleep in the very arms of pleasures eager and waiting for them. The vestal fires burn, have burnt faithfully on the sacred altars of their temples; and have never been once extinguished. They have violated no condition; and rightfully expect the laws, on which their lives and fortunes rest, will in honor be honored to them. But to-night, the city lamps and those of heaven, are suddenly extinguished forever. The maddened earth tosses herself. The mountain's top veiled blue in the azure expanse, always before inspiring pleasing emotion, is only visible in terror. It parts, and pours down a vitreous sea of raging fire, bearing on it the most terrific death. The whole city is buried deep in the entrails of the fertile valley, where it stood; all its lives and records lost; and it is naught now, but a fossil for some future musing antiquarian.

3. The fickle, fastidious thunder, or electric fluid, hides itself in the earth's great metallic veins. Its strength full grown, it frets the course of things:—darts through the continents; loosens their great joints, breaks in pieces the sea's deep bottom. The throat of death and destruction flies open, and the world tosses on its red forked spear.

4. Unwearied in kindness, nature pampers generations; visits them with perpetual good; but she lies in ambush, and waits for their children,—their children grown numerous and powerful by her own cares and lavishments.

While they are laying deep and wide the foundations of the metropolitan city convenient to commerce; rearing up the palaces for the long line of their expected Cæsars; arching the domes of their Emirs or imperial lords, not far from the sea-shore, she is collecting together, and depositing the vast treasures of her metalliferous bases, and combining with them elements of the most explosive power. But the place is dry; and they are not tormented with water, or permitted to slake their thirst. Quiet as lambs, in each other's embrace, these elementary forces, to totter and uproot creation,

sleep for noiseless centuries. Water now is wanting for the mowing scythe—the keen sharp edge of destiny; and, by the absence only of a few drops to ignite the great magazine, millions of lives are preserved in perfect safety. But the water is at some distance; and the storehouse is of massy rock. All sublunaries turn on the common hinge. The empire city goes up; and the seamen returning with the treasures of other lands, behold, at mast-head, its flaming turrets glitter far over the waves.

Ambassadors from foreign princes throng its resounding halls, to extend its external relations. Fortune smiles. In the midst of their rising prosperity and greatness, they look back to the infancy of their nation. They remember *gratefully* the first occupation of men to procure food to nourish their offspring. Under the name of *Diana*, they personify the *chase*, and establish her worship. The force which renews life, to which they are immediately indebted for their own, they represent under the name of *Venus*, perhaps from *venire* to come, and erect their worshipful altars. They fashion the stone to honor the great moving *Power** of the world.

Yonder among some trees, rises its proud Vatican, where on long ranging shelves is deposited the written wisdom of all ages and countries. The outer court is graced by neat statues of wisdom, justice, prudence and time. There, many-chambered, mounts its great Coliseum to the sky. Whatever is rare, beautifully wrought or curious, finds in it a place. Yonder, in huge iron chests or excavated stone, surrounded by impregnable walls, are the gold and silver—tribute paid by a mighty people; and the treasure of princes through many prosperous reigns.

* Accordingly, among all people, who have had reflection, except the Jews, history, in the absence of others, can trace the worship of these three divinities disguised under a great variety of names. Iao was the original, creating power; Venus or Freya, the conservative power of life; and, before the age of Ceres, the chase furnished the means of subsistence. Diana, who procured subsistence, and Freya, who renewed or reproduced life, therefore, shared with Iao, the original giver, the homage of ancient men. They constantly had need of these three; hence their universality, of which all history is so full of evidence.

Danger hath many shapes invisible. The ground feels firm and steady beneath their feet; but the moon, the *faithful, honest moon*, dashes the sea-water against the shore in eternal friction. The substance is worn away, but the outer crust is still left stable. Under-currents fritter away at last the rocky house of the magazine; the water gains access. There ensue a few hard and dreadful shocks. Men live not to see the struggle through; the land and the city break off together; and calm restored, the billows rest far above its topmost spires. The star-measuring mariner, having ploughed through many a sea, returns home from the gold or amber coast, but finds nothing except his empty latitude and longitude.

This is partially true, may be true of most all countries; and is not confined to the land of the Incas.

5. Little deaths ride on the atoms seen in the sunbeam; are resident in the dropping honey-comb; exhale in aromatic flowers; or play in the vibratory torrent of respiration. But the mother, the great ancient mother, retires from human sight; and hides herself in the low wet lands of old Lemnos, Euphrates' muddy shore; in the dark Sarbonian bog, the Nile's black watery fens, or in the great humid retreats of Africa's unfamiliar soil.* There, as some scaly slimy mon-

* The opinion pretty generally prevailed in all antiquity, that the plague and all pestilential diseases had their origin in Africa. This view accords with Sprengel (*Histoire de la Médecine*) and Le Clerc (*Idem.*) M. Fodéré finds reason to believe, the shores of the Levant are the most fruitful source of such maladies.—(*Dic. des Scien. Médicales*, art. *Pesté.*) Dr. Mead speaks of Ethiopia and Egypt, as the acknowledged original seats of the pestilence, which ravages the world—(*Works*, and particularly, *Treatise on the Plague.*) Mr. Gibbon mentions the *Sarbonian bog*, as having participated in generating that foul contagion, which so greatly depopulated the world in the age of Justinian, to the disgrace of the reign of that emperor—(*Roman Empire*, vol. 4.) M. Savary, against Pauw and a host of others, vindicates Egypt from producing contagion—(*Letters on Egypt.*) But he studied and wrote what was grand and beautiful and ancient in that country, and too partially loved it.

All tropical and citratropical countries are now known to be the frequent generators of pestilential diseases. Even "a blade of grass" growing near standing water, remarks Dr. Macculloch, may mark the seat of contagion—(On *Malaria.*) The phenomena of such are frequently hateful and odious;

ster, she rolls and tosses about unseen her huge fetid form. Sometimes in the dark night* she leaves her lurking-places to prowl about the streets of old Cairo, or slip over to vex Damietta, Alexandria or Rosetta; or making a wider excursion, she passes to distress Constantinople, Smyrna, or Salonica.

Covered in by impenetrable brush wood in her paludal haunts, she sometimes composes herself, and sleeps pretty quietly for whole centuries together. Once and awhile she half wakes, flashes open her big glaring eyes to observe the nations, and then sleeps again. She subsists on all living ruins; or, according to Lyell, her food is the locust and the crawling caterpillar or its chrysalis. If she reposes, she observes the progressive events of the world, and ever waits for opportunity to strike. Athens, for example, becomes the fairest flower on earth; reaches the summit of glory in arms, arts and letters. Archidamus is ravaging Attica with his fierce Peloponnesians. Dionysius sits on the throne of Syracuse a hideous tyrant; the Carthaginian is about to scourge him. The Æqui and Volsci oppress the descendants of Æneas.

Now she looks abroad; lifts up her form though huge, invisible; and erects her great blood-stained crest. She unfolds her broad pellucid wings on open day; mounts up, and flapping, fans each frozen pole. She passes from Pelusium directing her main route over where man is planted the thickest; traverses Syria, Persia, Arabia, the Indies; turns to soar along the western coast of Africa, then crosses over and visits Sicily, the Ægean isles, ultimately, Britain, France, Denmark, Hungary, Germany, Italy, Greece, Palestine, China. At her approach soul and body fly asunder; the countries make but one slaughter-house. She afflicts

and all people, who can write, have manifested a disposition to free their country from the imputation of the odium of their origin. Thus the syphilis was palmed unjustly on the South Sea islands and our America.

* To ward off the attacks of pestilence from the soldiers, who kept the *night-watch*, Assilini prescribed the besmearing their bodies all over with olive oil.—(*Treatise on the Plague of Egypt.*)

all; but comes to the aid of the Peloponnesians against the Athenians;* disappoints the Carthagenian, and favours the tyrant of Syracuse; helps the Æqui and Volsci against the Romans, if she did hit with her pinion the audacious Sennacherib.†

She retires afterwards for a season to take some rest. But the destruction of mortals by the sword, and the fierce forces with which our world is armed, is too tortoise-footed for her. She watches the nations. Mahomet flies from Mecca to Medina. The sword of the Saracen is unsheathed without a parallel, except in that of the Hun and Mogul. Already tottering under the blow received from the Romans, it cuts down Persia, overruns and reduces Syria and Egypt, plunders Jerusalem, and lays waste the African provinces. It besieges Constantinople; attacks the East and the West, passes from India to Spain; and from Spain is proceeding through France, where Charles Martel makes the first successful opposition, and wrests it from the gory hand of the Saracen. In only thirty-eight years, it deflowered the fairest gardens of the earth; and left the victim countries naught but the charnel houses of the putrefying dead.

As if jealous and infuriated at the exploits of the Saracen, now she quits suddenly again her shady Nile and Sarbonian bogs; puts on her panoply, and sallies forth in her greatest

* Vid. 'Thucydides' History of the Peloponnesian war, 2d year.

† We have constant examples of the sovereign ruler accomplishing his will by physical agents. Among men, who entertain a firm belief and profound respect for religion, there prevails a disposition culpable almost universally in our age, to confound all divine causation of events with the physical or common course of nature. Among the many, we select the meditative Kert, Sprengel. Reciting the science, civilization and medical knowledge of the Jews, and speaking of the plague, which was sent upon them in the reign of David to punish the vanity of that monarch, for ordering a census of the tribes, he says, "Jehovah regarda ce dénombrement comme l'effet de la vanité du roi, et envoya l'ange exterminateur, qui fit perir soixante et dix mille hommes. Le fléau n'arrêta ses ravages que lorsque les holocaustes et les offrandes du souverain désarmé la colère de Dieu." Again,— "Ils (the prophets) provoquaient des maladies quand Jehovah était irrité, et eux seuls avaient le pouvoir de les guerir."—*Hist. de la Médecine*, tom. i. p. 70.

strength. She hurls from the sky the jetty rocks; with a dark veil muffles up the orb of day; and no light escapes from the 4th of August until the 1st of October.* In the assassin darkness, she carbuncles the nations, war-bruised, and the wounds still open and uncicatrized. She pains their limbs and they cry for amputation. Unquenchable fires burn their entrails. The most fetid sanies, poisonous odor, exhale from the black ulceration covering their bodies. The scent of one man kills another; the sight of each other is death. All medicine is vanity—blasphemy. The noble emotions of our nature procuring succor are extinguished. Man flies from his hideous, misshapen fellow man, but dies, merely changing the spot where he is to fall.

All human laws paralyze, lose their force. Humanity outdone loses all moral shape. Pillage and rapine unrestrained, join the dark train of ruin. So much death, soon in some causes death to become unheeded, and its power unfelt. With harpy hands, they snatch the glittering jewels from the cold white fingers of the lovely dead; unloose the golden clasps, that bind her slender waist, dedicated to her at the altar of virgin purity. Before all are dead, the door of the private house is broken, and they live to see themselves stript of all their valuables. His fist for the last time clenched now in death, and his visage distorted, wild, the miser eyes the bold robber, as he breaks his iron chest, and counts his gold.

Death is too rapid on every sex and condition; burial and its rights become an idle, misplaced ceremony. The dead putrefy in the churches, the private houses, and strew the open field.† The hungry birds of heaven dare not taste.

Mussabat tacito medicina timore. The physician and his patient, the sovereign and the subject, the homicide, the assassin, the execrable, abominable, the polluted and the abandoned, die with the pure, the noble and the virtuous,—with

* Vid. The Universal History. Gibbon speaks of this darkness only as an extraordinary dimness of the sun. The Greek and Arabian historians describe it as perfect darkness.

† Tytler—Treat. on the Plague.

the pious minister and his adoring saints. One flood of putrefaction and pain sweeps them all alike into oblivion—the lover and her he loves; the mother and her blue-eyed boy; the father and his blushing daughter. The aged are tript up from the natural grave; and the infant, if he live, by the drying of his mother's bosom.

If the caterpillar and the dark night* of the locusts advance in the front, famine, lean, gaunt famine, pursues closely in the rear the trail of the pestilence, to glean what remains. The withered of time, who were spared, perish gradually with hunger. The strong and the robust follow them. Every pathway—tendency—conducts still but to the tomb. The widow mourning her husband slain in recent battle, and her naked children screaming for bread, are hurried slowly away; and she lovely, weeping for her love, fallen beneath the bloody banner:

O horror! fatum illuctabile! mortalitatis magna forma!!

If, about the close of the fifteenth century, the *Sudor Anglicus* pressed hard, in the actual epoch, we have seen the *cholera* slaughter. It travelled the great longitude of our world, nearly in the isothermal lines. After having stilled all the noise of joy, and put on Europe the robes of mourning, in the same lines it reached our America, where its course received some modifications from the peculiarities of our hydrology.

Thus, since history, misfortune, calamity, catastrophe moral, physical, have pursued closely our race, and agitated constantly our realm of existence. War has trodden in the bloody footsteps of war; the huge wheels of its chariot been dragged over the bones of the nations it had slaughtered, before they have had time to bleach. Pestilence, restless, furious pestilence, has walked in the path of pestilence, before the earth has sweetened from the former carnage. The locust, caterpillar, and famine, have not failed to erect their colossal form of death in the most beautiful, fertile—*man-bearing*—spots of the earth, and summon the petrified inhabitants to the great national grave. The seas have

* Beauplan.

changed their deep basins, and taken possession of the peopled lands. Earthquakes have disfigured the forms of the ancient continents, and made of the sea-water the common winding-sheet. The volcano's quenchless fire has continued to strike furiously at the living.—The earth distracted, torn by the imponderable elements she wears in her bosom, has continually buried untimely her own children; tosses at their blow, and constantly threatens to fall. The natural grave is not filled; gray hairs mocked; the forces of life not permitted to exhaust, but are crushed in their vigor.

The Numen, Supreme Power of nature, has been invoked, and attempted to be appeased, propitiated in the names of a hundred thousand divinities. All but a few of the old gods are now dead; countries have disputed over their tombs for the honor; and the august ruins of their great temples lie scattered in the wilderness—matters of wonder and curiosity to illiterate, living people. The bush and the bramble grow round them; the owl hid, hoots from the *sancta sanctorum* of nations; and the serpent lies in the cool shade they make.

The descendants of the Tartar and of Brama, worship still the respective gods of their ancient fathers. The religion of Abraham and Ishmael has swallowed up the balance of the world. And Islamism would die, but for its unholy, foul connections* with the sacred religion of Palestine.

Yet the Supreme Power has not cooled the hot bolt of destruction; disarmed red war of its noise; the steel of its sharp edge; the pestilence of its venom and putrefaction; famine of its locusts, its draughts and caterpillars; and restored to things a smooth course, and an inviolable order. In the present order disordered, the fair, the beautiful and good suffer, have always suffered; the hateful, the vicious, the deformed may escape, have always escaped. The avaricious testator may fatten on the widow and the orphan's substance; and natural good and prosperity meet him at

* Vid. Sale's Koran—Prelim: Discourse.

every corner of life; while the virtuous and the honest are borne down under innumerable calamities.

At human tribunals, the innocent and the good are arraigned, and die for the black crimes of the thief and the homicide, sinking their family name into unmerited oblivion; while the guilty and the polluted turn their necks from the edge of deserved vengeance; and flourish amid the accumulated honors of the world. At the tribunal of nature there is no distinction. The rain and the seasons come alike to all. The earth with her flowers pours forth her plenty for the lovers and the haters of piety;—for the miscreant, whose foot disgraces her face, and for him whose life is an ornament to humanity;—for him, who opens the veins of a nation to gratify his lustful ambition, subverting moral order; and for him who piously lends his power to console mankind and establish peace.

“It is in vain to serve God.” A hundred thousand have been faithfully worshipped by the ancestors of existent men; and the wealth and industry of nations taxed, to build altars suitable to their rank and dignity. The precious metals, rare and costly stones, all the earth holds beautiful, scarce and valuable have, at incalculable cost and toil of ages, been collected together, and curiously wrought to ornament them. They have, at all times, covered the civilized earth, and their spires burnt glittering up to heaven.

They have disdained human grandeur, glory, art, industry sacrificed, and refused to dwell in them; or put their hands on the rein which guides the world. It is idle to build more. They have not been noticed, although the blood of earth's fatlings has continued to be poured out, and the sweet perfume of burnt incense, rolled up in clouds to the very floor of their dwellings. It is silly to think of invoking more. There are no gods; or if they be, they enjoy eternal pleasures, and take no interest in our affairs below.* They despise our art, industry, the superb accommodations, architectural glory, by which we would invite them down. Or if they exist, they are two.†—The one, the dispenser of good, the

* Epicureans.

† Oromasdes, Arimanius—Manichæism.

other, of evil; and mortals should build altars to disarm the vengeance of the author of evil and implore the aid and benefactions of the eternal Sovereign of good.

WHAT, THEN, IS THE PHILOSOPHY OF A DIVINE PROVIDENCE? AND WHY HAVE MEN MISTAKEN, MISUNDERSTOOD ITS COURSE?

Man constantly feels the want of his Creator. Behold your species, whose great acts history has preserved. With what ceaseless, undying efforts, all periods, have they pushed their way up to the great axis, round which all beings turn; over what explorable depths of the universe have they not travelled, seeking the dear author of their being? Through the incorrigible darkness, a ray of light leads here and there. With what avidity have they pursued and grasped after the shadows and images of God, inestimable, invaluable treasures, through which they could contemplate, in the distance, the substance? Above the height of all heights; beyond all reach, how dear, how sacred the footsteps, even the slightest trace, perfume, He has left of himself!

Observe, from the shady inaccessible waters, where the crocodile reposes, he goes forth; the cat and the owl, under the covert of night. What they do is *visible*; but they are *unseen*; *obtrude not upon your view*. Think you the Egyptians, the Indians and the Persians held, and worshiped them as Gods? men, over whom science sat in her first brilliant meridians? Banish the vulgar, contaminating idea. Refrain to violate, pollute with unconsecrated hands, the first great beautiful images contemplation gave to thought—images which must immortalize as they grow older—venerable monuments mind has left of itself—pledges to us it cannot die; and, in other worlds, will rear up other monuments. Worshipped them as Gods? countries which could educate Moses, Hermes, Manetho,—had the teachings of Zoroaster, could produce the *Institutes* of Menu, the *Vedas*, the *Zendavesta*; rear up the eternal zodiac; shame by the works they left, all friction of time? Men, who could cut out of solid rock, and transfer 2000 leagues distance, the floor* of the

* Herodotus, lib. ii.

temple of Butis or Latona, sixteen millions of pounds weight by measurement, and lift it up where it now stands; who, with gigantic strength, imitated the works of nature, had knowledge to excavate a vast sea* in the sandy plain, and establish rolling waves for commerce?—Proof, that they had not only made great progress in the science of matter, but likewise of human nature, and understood profoundly the art of government.

They were deformed by monstrous errors, had great vices, but they were dark. Ignorance is a common principle, which unites, must unite all ages into one great community. Has the light grown brighter? we did not perforate the skies to let through its beautiful rays. Let us do homage to the compassion of the Being they sought, who pushed forward in sight of us, the everlasting orb of truth and light. They strained their eye-balls, but the rays fell sparse; we but open them and see. They did not see; we call, abhor them, *barbarian, heathen*. We see, but do not obey. We are the true heathen. God with them was a tormenting want; he is with us. They were our real brethren. They knew but little, but, how far with our forces, shall we ever advance in this unfathomable ocean of eternal radiance!

On the one side, as already seen, man is armed against his fellow man, and, in his war, mows down his existence; on the other, the fretful forces of his world, are armed against him. For him nature affords no asylum; her whole aspect is planted with his ruin. In her he can step but upon the decayed coffins of his species; he finds no pillow, where he can repose in security. Agitated, threatened in every part of his being, he leaps, must leap beyond her, to seize on the bosom of her great Father and his Father to hide in safety. Thus God becomes the focus of all sentient, reflective exist-

† This sea or the lake Mœris is described by Diodorus Siculus, Herodotus, Strabo, Pliny, as well as by many modern travellers. Herodotus makes its circumference 3600 stadia or 60 schœni, and its greatest depth 300 feet. It occupies ground extremely dry and sandy, and without springs, its waters being supplied by the Nile. They flow into it six months in the year, and flow back the other six months.

ence, and, as I have said, a want the most imperious. We feel we originally came from beyond the skies, where we left our Maker. In him only is safety, our prayers unconsciously rush up toward him. In his hands are life and death, and the control of their causes. Our prayers are reasonable, philosophical; religion is natural; all men are, have ever been, religious.

But the accidents of time have produced changes; the primeval religion is lost; and this natural religion become impiety. In these changes, its natural sources have been dried up; it carried back, and placed in the original fountain; and to be availing now, must flow again as at first. The earth has miscarried the first religion; it flew back into the bosom of God. All the traditions of early nations, in which are unequivocal traces of the ancient existence of an age of gold, of universal good will, peace, and harmony, bear solemn testimony of this moral catastrophe, which broke and swept away the beautiful ties, man first enjoyed with his Creator. Since then an outcast, with wild beasts for his companions, he has roamed the earth; prepared the crimson cup of war, poured it out, and it has run down, and left the red stain indelibly on all his epochs.

The last question of our inquiry is answered;—Why have men mistaken, misunderstood the course of Divine Providence?

The image of the Eternal Maker deformed, bedimmed, still had strength enough left to glow in their bosoms; and they continued to pour out their hearts' rich treasure on their lost, far distant, unknown Father. Born now disinherited, in perpetual orphanage, they squandered over the earth; and in its different countries reared up the sacred altar, as history sees, and made their offerings in the dark, accordingly to the opinions they could form of the wants, appetites, tastes, wishes, ambitions, pleasures of the object to be adored. Traces of this Being were still left, and constantly impressed upon them by the great operations of nature.

Shall a living man beholding his brother now on the high top of three thousand centuries past, scorn, heap on him

odious names and contempt? How low, diminutive does his intellectual stature appear! That top was covered in the thickest gloom, amid which he struggled and wept. Let him, confident in his colossal stature of mind, remember he may grace a darker shade; and that his brother, a *barbarian*, may be swept away in the mounting tide of those rays, whose excessive glittering once, "*from the sixth to the ninth hour,*" fastened on the uprisen orb of our light the darkest night. But our discussion being purely philosophical, we must not indulge, touch the sacredness of theology, although it borders here along our territory.

But the first question of our inquiry, confessedly difficult, remains—What is the

PHILOSOPHY OF A DIVINE PROVIDENCE?

Cicero, Seneca, Plutarch,—speak confidently of a governing Power of the universe. The principal events of Homer's song, are due to the agency and interference of immortal natures. Plato eulogizes the original artisan Force of the world, as controlling and conducting its affairs in time. From the reasonableness of the thing, Simplicius draws forth his argument for the belief of a Will, sovereignly free, who directs in the great action of nature.

Reason on the steep brink of all thought, has generally conceived of two, capital, separate acts of the Divinity. By the one, he created the world, which was suspended on its completion: by the other, he preserves it from nihility. To this last must appertain all providence. But since we know not the artisan Divinity, these acts, nor the proportions which created beings sustain with him, such distinctions must be gratuitous, or arise purely from our manner of seeing.

It is certain the universe was created at first; all its members have stood fast. The stars, which first shone, are still above our heads; the organic forms, which first lived, are still dashing on in the torrent of ages. All are progressing immortal on the great route of time. The mechanic force which impels them, must be steady; or what is the same

thing, the active properties bestowed on each by creation have remained *unwasted, unaugmented*. These properties, for we know nothing beyond, are the fountains of all their motions and phenomena; and exerting themselves, are neatly the laws of nature. To these properties we intuitively attribute directly all their acts—as the stone falls, the mind thinks,—the flower blooms. If, contrarily, we attribute them to the original artisan Force, the logical phraseology will then be, *God falls, God thinks, blooms*,—which is *Spinosism, Pantheism*, and nearly the exact conception of Malebranche. Pantheism is providence, but is abhorrent to the improved understanding of mankind. Providence, through the active properties bestowed on all beings at creation, to be exerted in time, commands alone the sanctions of reason and religion.

But in what consists the action on the world of the original artisan Force, which we call Providence?

The primordial elements of their creation, these properties constitute all natural beings what they are; and to their innate activity are due, as just observed, all the acts, phenomena, these beings put forth in nature. Indeed, it is to their properties, as original, exciting causes, we are indebted for all our knowledge of them, our ideas being the action of these properties reflected upon us.*

We see the mechanic force, which impels on the great route of time, or the properties of universal existence, put forth their efforts exactly equable in all duration. Thus the ratios, which measure any one cycle of the stupendous flights of matter, will precisely measure the correspondent

* For example, the phenomena of the property of the extension of matter, constitute our ideas of space; of its motions, those of time. Having the ideas, we can conceive the existence of space independently of body. But body is the instrument of its manifestation to us, and without such intelligence as ours, could never have been sensible of its presence. In like manner, we can think of duration unmeasured, such as eternity; but without first having the perception of succession excited in us by moving points, as minutes, hours, &c., this sort of extension or time, would have remained unknown, being imperceptible without definitions.

cycle the most remote; any definition or dimension, it gives to space, the same definition and dimension.

This perpetual equilibrium of effort, preserving the same eternal order and harmony in the progressive, material universe, holds, and is equally true, of the local properties. Each chemic atom of the most minute body is an *immutable entity*, as much so as the worlds they form in space. The polar forces of *oxygen, hydrogen, chlorine*—of the integral bases* of all bodies, at this day, giving laws for their chemical revolutions, in an order forever unchangeable, were the polar forces of the *oxygen, hydrogen, &c.*, of chemistry, when she drew her first breath at the creation. And if these forces have presented perpetually the same axis of each body in space, in the same relation to the central orb, round which they turn, they have preserved the same axis of every atom in every the smallest body of our planet, in the same relation toward one another. It can but be conceivable, were these original forces or properties to vary the least, ruin, in a thousand forms, would seize on the world. The precise angularity, resemblance of the same crystalline bodies of the most remote epochs, again furnishes proof of the unchangeability of the material properties.

The properties which animate vital and intellectual existence, persevere with effort not less equable. We see all living natures come forth with the same organic forms, the same lineaments. And, *cæteris paribus*, mind exerts itself alike, all ages, laying up treasures for future generations.

Every thing conspires to evince, that the properties be-

* Due to the age of Davy.—(Philosophical Chemistry.) To these forces all molecular bodies owe their forms. According to Brand, they are either solid, liquid, or gaseous. Atoms of similar poles repel, and give origin to the liquid and gaseous classes; those of dissimilar poles attract one another, and form the solids. The sort of polarity in the atoms meeting, consequently, decides the class of the body which will be formed.

Nature has need of the permanent forms of matter, as the atmosphere for respiration, which, according to these laws, would solidify, could the polarities of its atoms become dissimilar. She was, therefore, under a sort of necessity of fixing immovably these polar forces, in order to secure permanently the generic forms she needed in her material economy.

stowed at creation on all existences—matter in its cosmologic and chemic forms; the organic natures throughout the zoologic and phytologic calendars; mind, in all its modifications in living creatures—from the first moment they began to exist, have exerted their *pure* cosmic actions without disturbance.* It would appear, these properties were designed, by the universal Opificer, to execute, in all beings, the separate acts they were to perform in nature, constituting their cosmic individuality. And, whatever influence He may exert upon them, it is they which act in the same order, and constitute essentially the *action cosmic* or *physical*. For, if, in place of the properties, He directly excite a new action, in a new order, in any physical being, the action, in the logical structure of all language, is essentially *uncosmic* or *divine*, the action being attributable directly to Him, and not the properties, which is *pantheism*. But the universal forces of nature operating through all duration in an imperturbable order, as we have just seen, show that no such action or Pantheism belongs to her economy. And, if each of her small, and her great actors received, at first, the properties, whose equable, undisturbed efforts were to carry them through the career of time; and if upon universal subordination and dependence, the safety of each, of the whole depends; and is sustained by the just and equilibrious energy, action of each, of all, giving to her an immovably fixed and inflexible course, in what has this course been bent by human oblation;

* Geometry, in the sixteenth century, elated from the great flight she had just taken, laid her profane hands on the solar wheels, rolled them back the way they had come, through equal parabolas in equal times, expecting to find the chasm which had been made by the shadow going back on the dial of Ahaz, and by the sun stopping on Gibeon, and the moon in the valley of Ajalon. Fixing the moment when the rupture occurred; by notable feasts, which are known to have taken place at the new or full moon, she proceeded with all possible precaution. But, when she again had got the sun over Gibeon, and the moon back in Ajalon, Joshua and the hostile Amorites in the same position, no chasm appeared; and all was smooth and even in the long thread time has drawn out. Who can calculate for human folly!—(Vid. Natural Method of Astronomy.)

where in this world of sorrow, is there room to hang up prayer; and where are the miracles?

PRAYER—MIRACLES.

To-day, the sun is in Capricorn; the unjust laws appoint the death of a good man. Could he by his pious offering, confine the sun in the winter solstice; by shunning his own death, he would doom the majority of his race to perish by frost. He is tied to the stake a martyr; could he through his piety suspend the consuming action of fire, he would call up public death in a thousand shapes. He is under the falling tower of Siloam; could he modify the property bringing ruin, he would break loose the great connecting ligaments of the world.

“Shall burning Ætna, if a sage requires,
Forget to thunder, and recall her fires?
Or some old temple, nodding to its fall,
For Chartre’s head, reserve the hanging wall?”

It, therefore, cannot be, that the pious invocation of mortals retard, accelerate the motions of things, whose equilibrium is nature’s steady course; direct, modify, and bring about events, which otherwise could not happen, to accommodate and advance their private good;—that the answers to prayer, are procured at the expense of the steady order and course of events, or are true miracles.

Miracles* have really existed: but their forces temporary, they have left no marks on the face of things to bear testimony. They were needed; had their use in the moral and theosophical reorganization of the world; are monuments of divine condescension and goodness; eulogiums on our race. Their testimony is *revealed history*; and philosophy, out of its province, should contemplate them timidly, and with hallowed sensibility.

Besides, after all we may think, we know not all the springs, which move the universe: the eye of philosophy has not seen every thing. To the infinite worlds, which fly

* For their logical order, see, particularly, Campbell’s Dissertation on Miracles against Hume.

in space, angels may administer the draught of gravitation ; relume their fading fires ; conduct on their course. Invisible, subordinate spirits, may shape the living tissues ; weave the mystic filaments of the nerves, impel the vital flame of ages.

Finally we conclude from the facts, and from the whole ;

1. That the action of the original, artisan force on the world, or Divine Providence, as intimated, is through the properties, with which He has endowed all beings : 2. That, in these properties, was calculated, anticipated all the future action, or all the events they could achieve, and for which they were definitely instituted : 3. That our prayers or our minds praying are true physical causes, which operating with these properties or the other physical causes, of which they are a portion, bring about the events we desire ; consequently the events, which are the answers to prayer, are physical, and of the great physical order : 4. That the future action or all events are certain : 5. Upon this certainty, we are commanded to pray in *faith*, pray always, not *doubting*, in all things *giving thanks*, for, upon this certainty, our prayer, as an operating cause, must infallibly achieve the desired event or answer : 6. That the final ends of the universe are of the highest excellence and good : 7. But that order will be maintained, however heavy it fall on the disobedient : 8. And that in these properties, Divine Providence sovereignly controls in the revolutions of the world, maintains its great equilibrium, and conducts it on a steady course, through infinite ages, across the abyss of time.

MORAL EVIL.

We have had occasion to mention physical disorder or moral evil, of which Seneca had the most lively conception, when he said:—*Fulmina non mitti a Jove, sed sic omnia disposita, ut ea etiam quæ ab illo non fiunt: tamen sine ratione non fiunt: quæ illius est.*” The philosophical Seneca evidently believed God to be the indirect author of evil, which must be understood from *quæ illius est*. No feature in Providence or the divinè administration of the world, has

worried human reason more. We will close this long chapter by some reflections on death, which has ever been considered the greatest, and which the Stoics sought to subdue, and hold in contempt by virtue.

In the opposite hemisphere of our planet, let us conceive another race similar, but infinitely less fecund than ours, had been planted; and that this domain had been competent to hold their expanding generations. More fortunate than ours, they have maintained the fair image of their first creation pure; and preserved their natural immortality.

What must now be the personal appearance; the means of enjoyment, and the prospects for happiness of the ancestors of this people? Tanned by the burning suns of six thousand summers, their skins would have become solid *involucra*, hindering the freedom of motion. From accident every atom of their bones must have been crushed, and reknit together myriads of times, producing deformity; their whole flesh, from the friction and laceration of external objects, become one uncomely, frightful scar. From the unavoidable changes in structure by mechanical causes, and the consequent loss of symmetry, they would lose their suppleness and activity. They could have access to the tree of life of their paradise, eat its nutritious fruit, and enjoy immortality. But it would be immortality simply, without any of the noble enterprises, virtuous ambitions, lofty declarations, glory, which constitute life enjoyable. Their situation could not be much more enviable than that of Prometheus, chained to the rock on the frozen summit of Caucasus. For, we cannot suppose, because they are immortal, that their bones are not frangible; and their flesh subject to laceration and cicatrization. Nor can we conceive of any thing in immortality to prevent such accidents; and to suppose otherwise, would be to suppose them not men. Indeed, it would appear, that a living, immortal, organic body, launched on a sphere of our material activities, could have before it, but endless tortures; and could not measure its proportion of good, with the balance of things. How knotty and gristly, would one of these terrestrial immortals, we

here contemplate, appear by the side of one of the fresh shoots, and opening flowers of our dying and renewing race! In beauty and glory, how far would our life mortal outweigh this dull, stale, immortal life! And when we reflect that our short life in the sphere of its future action is permitted to take in the great life of the gospel, how noble, transcendent, does the Divine benevolence appear, which, before our creation, poised the good against the evil; and how sweet, beautiful does our mortality look out upon us!

CHAPTER II.

MATTER IN ITS RELATIONS TO TIME AND SPACE.

ALL physical existences form but one system. We have just sketched the relation, and the historical action of the First Being on this system. Here we will contemplate the action of one of the great, primary forces; the action of matter, in its connections with the two extensions of time and space, or in its cosmic productiveness.

SECTION I.

RELATIONS TO TIME.

All bodies molecular—molecular activity.

MATTER, first in the order of creation, exerted its forces first. Some of these forces, in their effects, are present, and occupy universal space.* All other forms of physical ex-

* Since, if any new body were placed between any of our planets, it would instantly feel these forces, we must suppose they enjoy a complete ubiquity over all the spaces occupied by our system. Some philosophers suppose creation still to be progressing; and that the planetoids, Vesta, Pallas, &c., are not only new to us, but new where they are. All they required to start on their elliptic orbits, if such they be, was to respond to the solar weight. These forces extend probably infinitely beyond our system.

istence coexist, and must constantly feel, reciprocate their action: All vitality, all mind play in them, and progress along time. Since all action, or, in the clear language of Laplace,* “L'égalité de l' action à la réaction, se manifeste dans toutes les actions de la nature: le fer attire l'aimant comme il en est attiré: on observe la même chose dans les attractions et dans répulsions électriques, et même dans développement des forces animales; car quel que soit le principe moteur de l' homme et des animaux, il est constant qu' ils recoivent par la réaction de la matière, une force égale et contraire à celle qu' ils lui communiquent, et qu' ainsi sous ce rapport ils sont assujettis aux mêmes lois que les êtrés inanimés.” So that our planet, all its lives, all its minds, with the sun and other planets, form but one great complex, dynamical body or being. One code of laws all framed upon the same great model, answers for the action, preservation and government of all, producing, by their special modifications, the phenomena, results peculiar to each, subjecting all to one harmony and one unity of effort;—perpetual demonstration that the Creator is but *One Great Unchangeable*.

The philosophy, then, which would contemplate any thing beyond the mere local properties and phenomena of animated existences, upon which I write;—of man and animals mutilated, cut off from the supporters, disjointed and thrown from their place among things,—must behold them in the great action and influence of their world, by the dim lights lit up here and there, that gleam upon them.

ARTICLE I.

Dissuasives from such study—Utility.

But what benefit can be derived from such vast contemplations? Why waste my thinking forces on things I can never comprehend? In the study of myself, if I can understand the anatomical parts of which my body is composed; the forces, by which it is animated; the conditions, which

* Expos. Système du Monde, p. 158.

secure its welfare, what concern have I with any thing beyond? and, certainly, I can arrive at such information, without a knowledge of general physics; without exploring things of which I can never reach the end.

In like manner, what has the mariner to do with the distant north and south, and the distant heavens? His course is through the seas, not among the stars or inaccessible poles. He needs, you say, but the star which guides his course. But were not the motions of all the stars found necessary in constructing the sea-chart, by which he sails; and have not other sciences, arts furnished him the means of appreciating these motions, and knowing the place of the poles? Though his course be through the sea, his chart would be nothing to him, without these other means to enable him to ascertain his place on it. Thus armed with the knowledge of heaven and earth—of universal space—he launches, and finds his way infallibly through the great ocean; knows to what shore every billow tends; and beyond the waves of far-distant seas in another hemisphere, his mind's eye gazes steadily on the destined port.

So the philosopher, armed with different arts and knowledge, with the great chart, logic of nature, spread out before him, launches on her vast ocean; sails steadily along; visits her different dominions; gains strength and clearer eye-sight as he advances; and passes into unexplored waters, where the ship of thought has never sailed. He makes new discoveries, which instantly advance the happiness of his species.

The knowledge or science of any one thing in nature, would remain forever an enigma and unproductive, without that of others. You suppose you can understand the structure, and what contributes to your organic good, without being conversant with the topics of universal science: But in the absence of a knowledge of the laws of light, general optics, what would be the meaning of the globular shape of the eye; and the humours of different densities, which compose it?—And how could the defects of vision, natural or from age, be remedied, procuring welfare? Let us study

rather what is laborious and useful, than what is simply glittering, and full of ephemeral pleasure.

In the dozing, crazy age of the old world, sated, worn with the toil of reflection, our country must be destined to augment knowledge. The gaudy literature of the actual epoch, must give way to more efficient, substantial light; and, in the sequel of ages, our America finish all thought begun, and solve the problems of science that shall remain.

The science of man, and the beings demanding the same conditions in nature with him, which we study, will contain the greatest number of these problems. Their frame-work, or what constitutes their whole, is scattered over nature's vast body, where it is to be contemplated; and must be gathered up to form his and their great picture. Corpuscular matter forms their base; furnishes the springs of all vital and intellectual activities—animates and sustains them. Let us study this matter.

ARTICLE II.

Progressive Knowledge—Perplexity—Uncertainty.

Since the Egyptians began to think and experiment—for the sciences came originally from the banks of the Nile—knowledge has been accumulating and advancing with a vibratory motion; and yet we may suppose our actual information of the nature of body to be very imperfect. In our day, its science has become infinitely more complicated. The discovery and developments of galvanism; electro-magnetism; researches in electricity, the polar attractions; application of new data to the explanation of old facts; correction of old errors; new and more luminous methods of investigation evolving new phenomena explicable, inexplicable, creating new science on science, have rendered the contemplation of corpuscular matter almost infinite.

While the field of this science has been widening and new difficulties occurring, the science of celestial matter or uraniology, went up, the last age, as I may say, suddenly to perfection. One property reigns, governs all its movements,

phenomena. From the exhaustless fountain of this property, geometry measured out forever the just proportion of motion to each celestial body; reason became satisfied;* its noise has ceased; and this fortunate science, subject like all others from its birth to change and amendment, now rests in comparative ease and quiet from the disturbance and depredation of philosophers. It will probably never change its great, fundamental principles; and has already reached the greatest perfection of which it is susceptible. Its certainty is the certainty of geometry, which brought it forth; and its truth can never alter.

But how exactly opposite, how vacillating, uncertain is the truth of corpuscular matter—this matter so intimately connected with all that we are;—which forms a lodgment for our intelligence; *breathing*, we call our *persons*; *indestructible*, is to emigrate with us to another life, perpetual *partner* of all our *thinking* and *feeling* in the two worlds. Every ray of light that falls upon it, but reveals some new darkness to hide it from us. Every truth gained by the hundred thousand minds pressing forward constantly in its discovery, only shows that millions more are left behind. The obtaining one truth only makes another one possible, keeping up solicitude; in getting one, which brings another within our reach, we get with it a thousand errors. To get rid of these, incalculable pains and toil are necessary. Some remain to worry long ages; some, forever. A great price must ever be paid for truth and certainty, which come to us through the media of error and falsehood. The truth, that can be obtained by us in any calculable amount of time, must ever be in infinite disproportion to what remains. If

* “So new and vast were the discoveries of Newton, and so great the changes he produced in the world of philosophy,” says Davy elegantly, “that they appeared in the eyes of other men, as objects do to those newly couched.” (Philosophy of Chemistry.) It was still, however, some time before his discoveries were generally accredited. Hook, Descartes, Leibnitz, were able to hold him, to some extent, in rivalry. Miller wrote his “Cause of Motion,” and Ogalahier his “First Principles,” in opposition. St. Pierre, (Studies of Nature,) and a host of others, were without faith. But he rose, where he now stands, without a cloud.

we get light, it only multiplies the volume of darkness. And our speculative, experimental science, wandering down in its varied streams, can never reach the shore, where its truth mingles with the boundless expanse of parent truth.

ARTICLE III.

Improvements by the modern philosophers—prospects of chemical science.

In the age of Empedocles, Galen, four elements composed this matter. Its science simple and easy, was soon comprehended. Now, as I have said, it has become almost infinite; and a whole life-time necessary to become familiar with its methods, and travel through its beaten route. Yet doubt, confusion, and perplexity hang over many of its most obvious facts; and reason struggles hard, not knowing what course she may pursue in their arrangement. In the actual epoch, Higgins, Berthollet, Bergman, Dalton, MM. Gay Lussac and Thenard, Wollaston, Young, Dulong, Davy, and a host of others, have attempted to tread in the path of nature; and exhibit a faithful record of her chemical phenomena in her own order. But how wide do their views often diverge from one another; and what great labor will devolve on posterity to thread out often the way truth has gone; approximate and reconcile their differences, as they have done for those who have preceded them? They have done much; discovered some truth—reared up the noble, proud edifice of the *atomic theory*, of which time must make Higgins the true founder, but which Dalton helped to build on the mother-ideas. They have built the vegetation—prepared thoroughly the fertile soil, planted irradicably the tender roots of all such truth; posterity will witness the glory of their growth; and their sweet flowers must exhale the perfume of their names.

They studied molecular attraction, on which depend the formation, decomposition—the existence, non-existence, of all chemical bodies. They ascertained the order, and established many of the laws of its operation. But its forces, in the different forms of matter, which fill the earth, and radi-

ate infinite space, in intensity, vary to infinity. Besides, innumerable circumstances, many impossible of detection, modify, suspend, or accelerate their activity. The field over which they play is boundless; far out-measures the forces of mind, which would follow them; and write the true history of their operations in the book of its science. The farther they are traced, the deeper the shade grows upon them; and necessarily so, since their ultimate action must be from the Omnipotent.

From all, then, which has so recently been achieved—so many discoveries brilliant as triumphant, which adorn our chemistry—the science itself has only received a true existence; and the course been fixed, it is hereafter to travel. And we may think, should our race continue millions of ages, governments become perfected, arts continue to ameliorate calamity, it may still be advancing and accumulating discoveries; and, as they have been the glory of letters, still be the true glory of the world.

But since chemistry is endless, why has the science of celestial matter so soon reached the terminus of its perfection? Is it, that the motions of vast masses, such as the stars, are more in our power, than the motions of atoms, on which the existence itself and constitution of these bodies depend? Like chemistry, perfectly demonstrative astronomy is a new science. In the actual time, by the best minds our species can afford, twice the amount of labor, probably, that astronomy has received, has been lavished on chemistry; and yet the career of discovery is ending in the one; in the other, beginning. Can we know what is so remote from us better than that by which we are immediately surrounded, and in contact, nay, a part of ourselves?

Astronomy principally is but one great idea—that of a force always of equable fulness, uniformly expending; the amount exactly regulated by the quantity of matter and the distance. This understood, with the subtending angle, the relative weight, size, density, distance—all the celestial phenomena become comprehensible, and of sure laborious calculation.

Astronomy does not investigate the nature of this force; it only studies the ways in which it operates; and in it, accommodates all the phenomena. So that if it were a million of distinct forces acting in concert, producing precisely the same results, and gravity, as it is conceived, had no existence, the science would remain untouched, and the same. But conceive each member of our solar system as atoms, gravitation, as aggregative attraction, which combines them into one body, and holds them together;—that this body now offer its molecular attraction, made up of the sums of each composing atom, to the other atoms or fixed stars in space. Repelling some, it attracts others, unites with them, commences revolution. In the course of definite time, it would run through innumerable changes, evolve a new creation of qualities, properties, new cosmic forms or worlds, the original atoms remaining the same. In this transcendental chemistry of universal matter, the mind would contemplate no longer simply the curved motion, but the mysterious, varied actions and results of this force impelling to these changes; would be misled in the labyrinth, and lost in the abyss, they would form; and we should have presented before us, the difficulties and perplexities, which torment the investigation of chemical bodies.

Could its powers be sufficiently augmented, the microscope might present the atoms of the hardest bodies at the same distances as the sun and planets. We do not, however, suggest this as the existing order, for we know not what this order so remote may be: But if we were to conceive the worlds in space, as elementary bodies, eternally creating through their heterogeneous attractions, an endless series of new forms of material existence, themselves stable and unchanged in all their creations, as the chemic atoms are supposed to be; and could ascertain this to be the actual order; it would add new dimensions and vigor to our poor idea of the Omnipotent; and be in accordance with the law, that, by the most simple and fewest means, nature always produces the most abundant and diversified effects.

The cultivation of chemistry, which contemplates the

operations and phenomena of this molecular attraction, must continue all ages to make fresh contributions to our knowledge of matter, while little may be expected from astronomy. Her methods of calculation are sufficiently perfected to answer all her purposes. By a sweeping generalization, she has reduced all the phenomena she studies to one law, beyond which she has nothing to hope. Her theory is complete. If she add new bodies to our system, which probably she will, the principles of their calculation are already made out; and nothing but conjecture can penetrate beyond her limits. It is the simplicity of her attractions, and the certainty of calculation, which have won for her perfection; and put her beyond progress. Her principal essence is empty motion, and a sort of idea of the volume of the universe; the intimate nature, constitution of worlds, and much more, exploring, isolated mortals could desire to know, being far above her forces.

The hope of the knowledge of matter rests futurely in chemistry. Its essence is the knowledge and history of its complicated forms of attraction, and the phenomena—this attraction! the first impulse, fervid breath of the Divinity breathed on *corporescent* matter, which lifted it from chaos, giving it form and the form of forms—this attraction! the perpetual life bestowed at creation on each individual atom, constituting each a functionary to perform its destined part in the smallest bodies, in worlds, and the system or systems they establish in space.

It is chemistry, that is largely the mother of the ingenious and industrious arts, which administers to our comfort, elegance and prosperity; which is subduing, and putting under the control of our race the great forces of nature, and elevating us to the supremacy, the lordships of this lower sphere. And, if ever we gain greater victory over disease; drive death farther from our cradle; abridge to an extent inconceivable now the process of labor; traverse the ærial as we do the watery deep, the honor will be greatly due to this science.

Chemistry, the creatress, destroyer, arbitress, of bodies, generates, suppresses, modifies, and combines force upon

force or against force, and forms a little corner of being, where man, as Chaptal so happily expresses it, is permitted, in some sort, to figure in imitation of his august Creator. The close dependences, and connections, which hold between our existence and matter—its stimulations, which are the functions, its vital, molecular combinations, which are the organs—ought to continue felt the deepest interest, and solicitude for the perpetual progress of this branch of knowledge.

ARTICLE IV.

Utility of atoms in the theory of matter—their energy—Phenomena of their first action.

Philosophers, who study the constitution of bodies, have generally felt the necessity of fixing a terminus or *echafaudage*, on which to rear up their reasonings in the form of doctrines, beyond which research is not to pass. Atoms constitute this *echafaudage*. All matter, as it now presents itself, is conceived to have originally been created in the shape of atoms, or to have sprung from them.

All that can be said about their forms, must be conjectural. But the fixing of their properties, was necessary to account for the phenomena, and satisfy reason. Their effects furnish the solution to the properties, and it is a deduction from them. They are, therefore, *hard, impenetrable, of various species, unchangeable, indestructible*; and endowed with *dynamical power or attractility*—condition of separating and recombining.

This attractility seems to have two modes of manifesting activity in probably most every species of atoms, the free tendency of which is to bring their axes in the direction of north and south;* or the poles are positive and negative.

* When the English philosophers first exhibited, as a curiosity, the magnetic needle to the Chinese sages, and explained to them that the north pole attracted the extremity of the needle pointing to it, a dispute arose. They asserted to the English the reverse of their position was true—that their nation had ever held as an indisputable doctrine, even, it seems, before this needle was known to Europeans, that the south pole attracts the extremity

Dissimilar poles, as before noticed, attract, tend to aggregation, solidity; but the similar repel, tend to liquidity or gaseousness. This hypothetical idea of matter created atoms, endowed with a varied and plenary attractility, through which reason is enabled to trace the history of the destruction and formation of the bodies they generate, locate the phenomena, ascertain and establish the order; mount up, and explain the great, finished operations of nature, which are only the complex expression of their simple actions, is sublime as beautiful.

The solidity of adamant, the explosion of fulminating gold, and other compositions, show the prodigious, incalculable energy of the different poles of these atoms—the little authors of all nature's visible operations.

On this view, that all existent bodies have sprung from original atoms; and that could chemistry now decompose them to their first elements, they would all resolve back into these atoms, it would appear, the attraction between oxygen and hydrogen, during the first epochs of nature, long predominated over the aggregation of all other bases. The *Ammonites*, *Orthoceratites*, existent, oryctologic exuvix of other extinct species, attest the primitive state of our planet was watery. It was upon water the Almighty went forth, bringing order out of confusion.

If this hypothesis of atoms be true history; and we conceive a sufficient number of them created for the formation of our system, armed with the power of attraction and repulsion, the force of which we witness in solidity, terrifically in the explosion of some chemical compounds, thunder, volcanoes, steam; and all suddenly placed within the sphere of one another's action, the hour of final creation, or when these forces were exerted to produce the present forms of nature, was an hour of most inconceivable struggle, violence, and uproar. And the "bubbling, tossing deep;" "the red thunder roaring up from its bottom;" the destruction of Ymir, or

of the needle pointing to it. We may suppose both parties had arguments equal in their favor.—(Vid. Staughton's Embassy to China.)

something similar, which we read in the cosmologies of ancient Scandinavia, Chaldea, India, as brilliant fancies, may have some pretensions to reality, as spoken of in the ark of Noah, whose early descendants peopled these countries, and orally, from Adam, who lived near enough this period.

ARTICLE V.

Impotency of Analysis and Synthesis—Speculations on the Natural History of Atoms—their general adoption.

Could these two great methods of operative chemistry be perfected, or science of compound attractions, which are the sum of the atomic polarities—nature's complete art of body-making—be perfectly understood, it is conceivable it would be possible, in some sort, to assign to each class of existing bodies its probable epoch and order of production back to the creation.* But such attainments are without hope. If analysis has successfully undone some compounds, and synthesis perfectly recomposed them, how many resist all effort; and especially among those of the organic class? Some philosopher produced pretty cleverly a mock egg of sulphur, albumen, et cet., but was unable to put round it the shell. The field of analysis is extensive; but in its destructive decompositions the atoms often scatter, or undergo such changes, as not even to be registered or regathered for the reproduction. It is always easier to build downward than upward.

The path of nature is shut up; the course bodies have come is not demonstrable. If part of the atomic forces, which guide the career they are making in time, and con-

* In our age, geognosy is taking a prodigious flight, and expanding light, mixed, however, with darkness, on many topics which, heretofore, have remained in the most profound obscurity. Chemistry holds up her flambeau, and contributes her aid. It is impossible to foresee where its discoveries will end, or what amount of truth it may uncover. The different ages it assigns to rocks and strata, or epochs of their formation, must be wide of certainty. A greater approximation may be made, but absolute truth, continue impossible.

trol their destiny, plays in the light, the other part plays in the dark.

These atoms themselves are not properly bodies, but simply their *cunabula*: all on this side of them are of the physical order; all on the other hyperphysical. They constitute the sum of all material, secondary causes. To these causes as revolutionary powers, we still attribute all the changes in the material forms. Created with a varied attractility, they constituted the first order of nature. All the bodies that exist were calculated, contemplated in this attractility, achieving instrument of the Divine Will. In all these bodies, we see a limited number, and a definite series. In their great masses, they are suns, planets, comets. As constituents of the earth or small masses, they are gases, liquids, solids; or the atmosphere, sea, land. The land again chiefly is metals and earths; their various combustions and acidifications are the principal ingredients; the sea is burnt gases, the atmosphere, gases unburnt; each class of combining bases, giving origin to a definite series, on which chemistry founds its nomenclature.

Accordingly, we have just seen that this attractility of the rudimental world, has only two modes of activity, is limited in its action, must operate to definite results, such as the facts of matter before us present.

The constitution of bodies is known to depend upon the equilibrium of effort of their composing atoms. This equilibrium overcome, their destruction or change of form is inevitable. All bodies are, therefore, phenomena of the equipolence of the varied activity of this attractile, parent force. This activity unequally modified, consequently, is the cause of all their revolutions.

The work of the Divinity, these atoms occupy the first place in nature's ponderous body. He originated, and clothed them wonderfully with operative powers; and what they do is his own almighty work. He legislated upon them, and their order of being stood forth in action. By their efforts as secondary causes, they push forward, and evolve in space and time their varied phenomena, the special objects

of his will. Pushed into action at the creation, they have continued still performing the same functions:—the stars burn, planets traverse space, seasons return; the same body flashes in the lightning, thunders in the volcano, whispers in the zephyr, blooms in the rose, organizes in the worm, in the tissues of man, and becomes the instrument of feeling and intelligence.

In all visible existences, we behold this universal, ceaseless, progressive movement. Futurity presents itself as the common centre of a great magnetic attraction, to which they are tending, but which forever, as they approach, advances farther forward into the abyss of the future eternity. We know not the proportions of futurity; how far this movement will advance, or in what it will finally end. We love to contemplate its order, as the arrangement of the Great Being, of whom it can only be said I AM, as appertaining to Him, the developments of His Will. Philosophy is an absolute want of our intelligence; we delight to meditate this stupendous movement of the universe; we feel interested in it; one day it is to land us in His presence. The farther we can penetrate into this order, the more the joy of our love and admiration is excited. We love the order, we must love the Orderer. Through the love of Him, through piety and humility, his truth so tragically established, we hope finally to arrive at his sojourn; to be eternally united with Him; where this order will be more accessible to the labor of thought. But why do we think it lawful to approach Him only through the surviving essence of our minds; impoverish our corporeal, and load with so many accumulated privileges our future, incorporeal life? Is He not omnipresent now, as He will be then? On whatever we fasten meditation, we hear his voice calling. We love;—his presence consoles;—may we not run after Him through the whole, great, future action of our world, the motion of ages, in which we have travelled, carrying us still nearer to Him?

All error is of us; truth, of Him. This action is the truth of things. We can only meditate it partially; it is ancient to our reason; will be ancient. Its forces, as they exist in

matter, we suppose to be resident in atoms. These forces exist now ; they must always have existed, and been coeval with body itself. They must have existed in *corporific entities*, or what we call atoms, or they would be effects without causes. Such entities created within the sphere of one another's influence, the evolution of bodies, would be the orderly result of the operation of their excited forces. And such a view accords strictly with the great law already mentioned : From causes the most simple, nature produces effects the most abundant and varied.

The first epoch or state of nature, consequently, was incorporeal. This *corporescent* world, of which reason draws the picture, appears to us to meet some countenance in the sacred account of it : "And the earth was without *form*, and *void*"—enjoyed not its present qualities and properties, although it was called "*the earth*."

Boscovich laid these archchemic atoms aside, and conceived, if we admit the separate, empty existence of attraction and repulsion, by their exercise, they would produce in us the entire sense and perception of all the phenomena of the material world, we enjoy. If Boscovich be true, bodies do not yet exist; and all nature is but a spectral representation or illusion. For, from the simple action of attraction and repulsion, it is inconceivable, that any thing besides, should proceed from them. But if we add to these attractions the atomic entities, the production of body is of easy and familiar conception.

Although we may never profound this philosophy, and ascertain certainly, whether bodies arise from pre-existent atoms or something not they, the forces we attach to them, must inevitably be universally admitted, and admitted, too, as forming parts of created entities. For, it is such admission alone, which distinguishes between what is *physical* and *divine*; and without it, as in our first chapter, we could never, in truth, predicate any action of any material being. Consequently, whether atoms exist or not, reason must ever claim, in their place, something of similar efficiency, or ban-

ish pantheistically from its philosophy of matter, all secondary causes.

The doctrine itself of atoms is very old. It was long popular in Greece; and was embraced by a great number of illustrious men, who flourished in the annals of ancient science. Diodorus and Leucippus, in their atomology, made the atoms eternal. Thus they supplanted a Divine creation of the world, and fell into horrible atheism, of which the modern idea is a confutation. Atoms enjoyed the approbation of Newton, Davy,—are in use among all living philosophers.

ARTICLE VI.

Atoms limited in their mode of productiveness—their innate, exhaustless susceptibility of new material existence.

In the actual state of knowledge, all the variety of existent bodies are regarded as being composed of about fifty-seven elements or first principles. In proportion as science has advanced in modern times, their number has increased. We may suppose all these elements still to be compound bodies; and, in their complications, removed almost infinitely from the pure, original elements or atoms;—that many of them will yet yield to the action of the voltaic fire—so successful in the hands of Davy—to the future action of analytic chemistry.

The supposition, that these elements are compounds, is supported on the considerations:—1. That the terrestrial heat or temperature appears essentially due to the attraction to solidity, and to molecular movements, to which the solar rays are potent stimulators: hence the bearing of these rays on climate, on *phyto-zoogeny*:—2. That before and at the commencement of this molecular movement for the first formation of bodies, the state of nature was inconceivably cold, as must now be the regions far *removed* from this *movement* or interplanetary spaces, the first degrees of which cold are felt on top of our mountains under the equator, and elsewhere:—3. That this movement of the first elements of

bodies, because of original coldness, was extremely slow and sluggish at first:—4. That, in proportion as the heat was evolved or the temperature raised, this movement, with the evolution of the material forms, became accelerated:—5. That the forms produced in the lower temperatures, would, inevitably, be destroyed in the higher:—6. That this alternate generation and destruction of forms would continue, until the two attractions, or that of solidity and that of expansion, hydrogenation, became balanced; when these forms would begin to become permanent:—7. That if some bodies are instantly produced from their bases, others of more complicated attractions are the slower growth of time:—8. That, consequently, these first forms were of the simpler combinations: 9. And that these combinations, become permanent from the steady equilibrium obtained between the opposing forces, would become the immediate bases of the more complicated, fixed forms; or the true elements of the permanently existing bodies of chemistry and geognosy. These bases formed the great arena, where the elective and other attractions had their struggle, and through their uproar and tumult, brought the forms of matter to the states in which they have remained.

In the present condition, under which bodies exist in nature, or in the equilibrium of the opposing forces, of which I have said they are the true phenomena, there are some, whose constitutions are so delicate, that they can scarcely exist at all, or exist only in certain states. The moment they are produced, some destroy through gasification, some, through oxydation, and other chemifactions. In the actual temperature, quicksilver remains thawed or liquid; phosphorus burns. If we were to conceive the thermal globe raised a few hundred degrees higher, most all existing bodies would lose their constitutions or change their forms. The sea would be vapor, iron, a liquid, quicksilver, a gas, phosphorus, like those fugitive forms I have just mentioned, of the rising temperature, from the molecular action, which produced the first successive series, would no longer exist in nature. And were the rates of the conflicting attractions

balanced still higher, or this temperature still raised, if the light of facts lead right, all the existing forms would become fugitive, as in their cold, primeval production; they would present new phases of existence, or fall into the impossibility of form.

The atoms or true elements, therefore, of all bodies in the present state of nature exhibit but a single phasis of their being; and, under a varying series of their condition, would be capable of unfolding the rich treasure of their forms now concealed, and presenting an infinity of new, material existence—new worlds.

ARTICLE VII.

Place of Atoms in Nature—their logical order.

From the reflections of this section, it is concludible, that the molecular, dynamical forces can only impel the material forms through a limited series of revolutions, which the atomic theory confirms; that these revolutions never descend lower than the combinations, which first became permanent from the equipolence of these forces; and that, in the actual order, they will never ascend higher, or new bodies evolve futuŕely that do not already exist.

The atoms with their forces—the true *materia prima*—therefore, occupy the first place in the material economy, constitute the active springs of all bodies, and impel to all their morphogeny, morphological changes.

But whence can they derive this ceaseless, changeless action, but from the Divine Omnipresence in which they play? this ancient, eternal Motion, Activity, which worries the universe! for a sluggish, inactive Omnipresence is inconceivable. This Eternal Motion offering its impetus is neatly *natura naturans*; they themselves, with their consecutive effects, *natura naturata*. And, since the ideas are of clear and distinct comprehension, we insist finally, that all philosophical language should make the distinction between the *natura naturans* and the *naturata*. Would philosophers once adopt this logical distinction, all the obscurity and con-

fusion, which have arisen, and perplexed from the neglect of it, would be banished forever; all physical and divine causation would no longer be confounded together, but would appear in a clear and intelligible light.

SECTION II.

RELATIONS TO SPACE.

By the properties of extension or active impenetrability, body consumes, occupies space: or another body is prevented from existing in the same place at the same time. The relative position of space so occupied is place; or it is a modification of space produced by body. Body evidently defines space, and alone manifests it to our senses.

ARTICLE I.

Porosity—probable smallness of the real amount of matter in space—hypothesis of the motion of atoms in curved lines.

The number and extent of places or celestial spaces filled and occupied by bodies, manifestly, are in almost infinite disproportion, to the number and extent of those unfilled or empty. So that the great amplitude of space, contemplated in relation to the actual amount of matter it contains, is comparatively a vacuum. This vacuum, judging from our planet, must still be much greater or more complete, when we consider what is highly probable, that the intermolecular spaces, or spaces existing between each composing atom of the hardest bodies, compared to these atoms, may be equal in size to the spaces between the heavenly bodies compared to these bodies.

According to celestial mechanics, the density of the bodies of our system, diminishes as the distance recedes from the sun; so that, "if the mean density of the earth," says Nicholson,* "be supposed to answer to that of common green glass,

* Introduction to Nat. Philosophy, vol. i. p. 216.

the sun's density would be equal to that of dry pear-tree, Jupiter's to cedar, and Saturn's to cork;" or the exact, geometrical numbers of these four bodies are, 100, $94\frac{1}{2}$, 36, and 400.

According to this law of increasing porosity from the great, planetario-solar balance, the bodies, which traverse the extreme circuit of space belonging to our system, must be of amazing rarity: while those nearer the sun and exposed to a greater amount of calorific repulsion from the influence of his rays, only enjoy their proportional degree of density, since, generally, the more solid bodies are, the greater degree of heat is required to produce in them a given change. Whatever the rates of adhesive attraction may be, when we consider the number and size of the bodies of our system, that their mean porosity must be very great, and the number and extent of the interplanetary spaces, the amount of space actually consumed or filled, compared to the whole, must be extremely small. And, if what I have suggested as probable, be true, that the intermolecular spaces compared to the size of the atoms, be equal to the interplanetary spaces compared to the size of the planets, so that the sun with all his planets considered as a whole, forms a body solid as our common bodies, or as those of the mean planetario-solar density, the real amount of space belonging to our system filled, must be still much smaller.

On the porosity of bodies, Newton erected geometrical data, by which was established the probability, that could the atoms composing our earth be brought into actual contact, its whole volume would be so contracted, as to be contained "in a lady's snuff box." The proposition is startling enough, and the most that can be concluded from it is, the bare possibility. For, neither the spaces, nor the volume of the atoms, which the most of the good *savans* conceive to be enveloped in electric or igneous atmospheres, are knowable or capable of measurement. Most all bodies may be condensed, or the atoms brought into closer contact. The spaces really exist.

We behold the earth with all the great bodies of nature, moving in curvilinear order through the spaces appropriated

to them. May not one day, those to whom we will be the ancestors, discover, that all the molecules of chemical bodies, move, in like manner, through the spaces allotted to them; and thus another step farther be made into their real nature? The reason, that the atoms of all bodies are placed at suitable distances from one another, as are the great bodies in space, will be understood; all matter will be clothed with one great type of movement, gravitation, all molecular attractions, as they are now suspected, will be known to be one; and the venerable axiom of all antiquity, "that nature loves circular motion," be forever established.

Upon the hypothesis of an aërial fluid flowing in opposite directions, or in different circles in magnetic bodies, Euler accommodated, and accounted pretty well for the phenomena of magnetism. Should this idea of a particular matter moving in circles, ever be extended to matter in general, then the ideas of this great man will stand in the archives of the illustrious achievements of mind, as the rude stones the first Greeks threw together for glory, before they learned to rear the noble column.

If proportions are observed to hold between all physical existences, which connect them, and indicate their reciprocal properties, what is the meaning of these spaces between atoms and those of the stellar bodies, which, placed by the side of the real amount of matter they contain, present comparatively a pretty perfect vacuum? Since all motion depends upon empty space, they must indicate the prodigious mobility of matter, whose efforts necessitate, and make them useful in its economy. And, if they constitute the true measure of material energy, whose displays our science can appreciate for any definite time, how does its source triumph over all comprehension! The expenditure for our planet is about 60,000 miles per hour. We might conceive of power enough for such motion for one hour; but the supply to sustain such expenditure in so many ponderous masses through interminable ages, is fully inconceivable.

In all the bodies by which we are immersed, this energy displays itself in the perpetual attraction and repulsion of

all the particles; and in a ceaseless tendency toward the earth's centre—tendency, that manifestly maintains the individuality of the cosmic forms. The existence of spaces more or less great between the particles is incontrovertible; but their use, or the relations they sustain to the particles, which penetrate them in condensation, vibrate through them in the action of elasticity, await the future action and disposal of physics.* As already suggested, the intermolecular spaces may serve for some specific movement of the atoms. The balance of the dynamical, revolutionary forces, to which the existence of all chemical bodies is due, resembles very exactly the centripetal and centrifugal balance of the bodies in space; since, like these bodies, the constituent molecules are sustained where they are by the equal exertion of opposite forces. But whether their movement be in curved lines, or they move at all, cannot be determined. It is only from the analogy of universal motion, that their mobility may be suspected.

The operations of our intelligence are too slow for the operations of matter. Nature presents her bodies already finished; in their transitions from one form to another, our senses cannot trace the intermediate stages. We are sensible, for instance, of the properties of silex and potash, but in their chemifaction into glass, our senses are met with altogether a new set of properties. The two substances have not only changed in themselves, but mysteriously changed their relations with our senses; our mind has not progressed with the action, which formed the glass. The fact stands alone by itself. A piece of silk velvet is presented us with all the facts. We can witness a worm feeding on the leaf of a tree; the leaf or the mucilage elaborated by its living organs is drawn out, and dries a thread, the material of the manufac-

* It is true without a varied porosity of bodies, or specific gravities and elasticity, many of the familiar operations of nature could not take place; as the elaboration of clouds procuring the descent of rain; the healthy ventilation of countries; animal and human phonation, et cet. But these are only the remote sequences, and do not relate primarily to the porous state of matter.

turer. We can behold the operations of the loom, the different processes by which it is elaborated. But let us suppose this substance presented in nature's manner, its existence a solitary fact. In the progress of ages, all the phenomena would be observed; philosophers would make efforts to generalize these phenomena, and reconcile, square them with the existing laws of matter. Many theories would exist, and many ponderous tomes be written. These theories would differ widely among themselves, but their general tendency would be to connect the phenomena with these laws, which are only more universal expressions of facts; and the velvet would receive a name accordingly to the conceived manner of its production. New discoveries in other substances would be made, which would contradict this manner of formation, when these theories would become obsolete; and in proportion as these discoveries advanced, new ones take their place. In progressive time, sages like Pythagoras and Newton would rise, go beyond all antiquity in some 'new and more plausible conjectures, fix the limits to human research, and burthen the world with the loud noise of their fame. But is it likely, by all the observations, researches, that could be made, while ages endure, that any of them, in their account, would ever thread out, think of a *silk worm*, the *mulberry leaf*, and the manufacturing loom? Nor can we tell, beholding only the finished work, what that labor of the particles in bodies may be, upon which depend the eternal perpetuation and rejuvenescence of the world.

ARTICLE II.

Beauty, grandeur of matter in space—immensity of its action—disproportion of our Senses.

In space bodies extend, and through the exertion of the impenetrability of their molecules, keep other bodies from occupying their place. Thus they maintain the distinctness of their forms in all their changes; and display those properties which affect our senses, and by which we become acquainted with them. If the molecules are on the career

of ceaseless changes; in celestial space, where our earth appears a luminous and glittering star, though dark on its face to us, the great forms of matter make their perpetual revolutions.

But in space simply we can see but little of them; they pass over the field of our observation, and return; and what they do, darkness with all its shades is ever ready to conceal. It is in the compound of time and space they display their colossal strength;—that matter manifests its immensity, its titles to lofty grandeur and dignity; and impresses upon us the greatness, majesty of the Creator.

These are the “wandering fires” of elder times, which inspired the Thracian bard with tuneful song; which Sanchoniathon saw with overpowering sense; on which the shepherds, when the light of astronomy was kindling, gazed at night on “high Idumea’s top,” or by the side of “Tagus’ noisy stream.”

How has man figured in this mighty duration! Since then, how many mighty, noisy empires have risen and fallen! Where is the huge sceptre of the Babylonian, the Persian, the Greek, the Roman; where are those overgrown lives, which filled so often the world with tumult and uproar; where are all those chariots of war, and the blood spilled for glory; and where is that long caravan of generations, in which myriads of millions of men since have trod in one another’s footsteps? They are stilled; effaced; they are nothing; and what they meant to be eternal with their names, has perished, passed as the ripple on the water. Man in this duration weighs lighter than the breeze; he floats in it as gossamer, the thinness of nothing. Organic man, anorganic worlds!—there is no proportion—they will not measure together.

Still here they are, the same “wandering fires” that shone in the first blue sky; which routed, chased away the night of primeval eternity, their order, strength, beauty, glory unwasted. Here they are “the torches” still that “rove above,” spheres proportioned in magnitude to the vastness of the spaces they traverse, forever melting into

oceans of liquid brilliancy, but never dissolved. Their dominion fences out the chariot of death; they are without antiquities. No bone bleaches on the field of their high dwelling; nor does the narrow house find room for the thing which had form to crumble. No pulse has uncertain beat, or leaf of autumn's to mar the freshness and beauty of immortality. Flow down from them forever, in equable fullness, broad, deep torrents of mixed light and fire. These torrents fell on the garden of Paradise, when the tall palm and poplar, the leafy tree first expanded the shade, amid which the first father of men wooed to his bosom the blushing creature sprung from his own substance. They have fallen on the tombs of all his children, the tombs of nations, which have crumbled, disappeared. These same-torrents from the same fountains, drench the earth of living men.

In this dozing epoch of things; time to let go existence, when ruin is sated, so many passed to the quiet of nothingness, here I say they are still. What are they! old without age, worn out, unworn, lived over the being of every thing beside unhurt; being that cannot unbe, worrying on alone in the abyss of eternity! What is their enigma? mirrors of the Divinity, in the reflection of which we live?—we have revelation pure: ornaments, that decorate the landscape, which borders round the palace of nature's sovereign? domes, houses of an ancient race of an ancient creation, of men mortal by organization or immortal by the adjustment of the laws of matter—scenes of civil, social life, of the temples of philosophy, letters, religion, government? lights, that guide from weary lands? What are they? Their streams wash up and chafe against the long shadow, beach of time, dreadful to us wrong with ourselves. To get where they are, what power have they expended? to get on further the same power remains. What infinity, how inconceivable! Prepared for flight at creation, they have continued since to traverse thousands of miles per hour. Where is the great, holy sanctuary of nature? are events transpiring there, which necessitate such everlasting, rapid motion, and which connect such flight, motion of matter in relations to things, we

cannot think?—And their enigma appertain to an order, dispensation, we have not known? of which our mind, trameled in organization, may feel the wonder, but cannot, dare not think the great meaning.

In the perpetuity of its noble forms, and stupendousness of its great functions in the universe, matter seems to triumph over, swell above the diminutive stature of our thinking nature, and shrink it into insignificance. But once we are decomposed by death, we shall be out upon its immeasurable field; and if it triumph temporarily here, we shall hold it in rivalry, and approach nearer the Fountain, of which it reflects only the palest and feeblest rays.

All our meditation upon it, but excites the more our astonishment. Its great story, as broke to us by our senses, can contain but little of the true meaning. Enveloped ourselves in its dark shadow, we can see neither of its two extremes; and what we do see, we can compare but imperfectly with what is unseen, and thus push forward our conceptions. Besides, are not our senses proportioned to our existence, which is itself only a single element of our world, occupying but a speck of time and space? and is it not probable, as Fontanelle has observed, that they do not recognize one of its facts in a thousand, and were their number increased, its properties and phenomena would be increased proportionally to us? Hence, partly, in the study of its operations, so many unanticipated results occur. It is its simple phenomena our mind contemplates to most advantage, as will appear shortly, when we shall study its dynamical connections and influences on organic beings. There can exist but little doubt, could we comprehend the philosophy of matter perfectly, there would be but little difficulty in understanding the nature of all vitality and intelligence; and, that every step we advance in this philosophy, will be so many steps made towards the knowledge of our own abstract humanity.

ARTICLE III.

Operative or functional forces of bodies.

“If the laws of the material universe,” observes the Marquis de Laplace, “are competent, through infinite ages, to maintain its actual order, it is inconceivable they can account for this order itself.” The originating Cause being distinct from them, they only by their operation preserve it, the *regulatorum regulantia*. Since the great composing bodies have different temperatures, densities, magnitudes—circumstances peculiar—which modify the universal weight and centrifugal force, each demands a place or sphere of activity in the distribution of the whole peculiar to itself. This order was necessitated to give these laws efficiency in preserving each in the place proper to it, and proper to the whole.

The distances at which they are located, prevent their molecules from mutually preying upon one another, and spoiling their forms, this law of attraction and segregation being limited in its operation only to short or imperceptible distances. This force or law so fecund in changes of our terrestrial matter, with equal or greater activity probably agitates all matter, since we see the celestial bodies repel unceasingly from their surfaces, oceans of radiant particles; and, in relation to other forces, which are universal, may be styled local.

Every atom in all bodies exists in a state of ceaseless attraction or exertion of this local force, by which they are preserved through each successive instant of time. And we can but perceive, had each atom in individual bodies, at the first formation, enjoyed an attraction for its fellows superior to that of all others, every form of matter had remained permanent, indestructible. But such order of combination did not hold; atoms of feebler attraction for their fellows than for others, went into forms which have subjected all to revolution; and probably us, with all organic existences, to death.

If chemical bodies are sustained by the constant, equi-

bricious exertion of their formative forces, or that of the attraction to solidity and that of hydrogenation or repulsion, the astronomical bodies are preserved by the constant effort of the attraction, which disposes and keeps all their parts or their bodies about their respective centres. This attraction is known to be the same as the universal weight, which modifies as the squares of the distance are modified. This weight, with the centrifugal impetus, which, in effort resembles repulsive molecular attraction, maintains and regulates their orbitary motions or their places in space. The sun's is the reigning empire force in the system. This force radiates in every direction from him indefinitely through space, and grows weaker as the squares of the distance from him increases. The universal weight, one of the first conditions in all celestial motion, is the excess or predominance of the solar force over all the planets. If x represent the sun's weight, and y that of all the planets, $x-y$ will be the neat expression of this weight, which, with the centrifugal impetus, as I have said, sustains the great action of the system.

The opposing forces, which govern in the morphologic vicissitudes of bodies, the attraction essentially cosmic, which sustains about the centres of the sun and planets all their parts, the centrifugal energy, which is contrary and in its efforts constantly opposes this attraction, constitute the first elements, conditions of the existing order of the material universe. All corporeal phenomena, the great solar movement, are due to the conjoint exertion of these varied, opposite forces. The amount each world reciprocally displays in space, is the sum of all the composing atoms. Under all the modifications of distance, magnitude, temperature or density and porosity, astronomy has measured their precise action; and claims to be the most noble monument of human genius and persevering labor. Animated by these different kinds of force, all geological and chemical bodies pass through their changes; the sun and his planets perform their revolutions or discharge their functions in their economy; and administer to the life and intelligence, they all may nourish as their *appanage*.

The discovery of the universal weight or the reciprocal attractions, of which Kepler developed the laws,* and Newton made the general application, could only be the work of ages, after a vast number of observations had been carefully made. It presented the capabilities of matter for action in novel light. A dogma had long reigned in the schools, *that nothing can act and produce effects where it is not*. The simultaneous activity of Divine Providence in all places, would be accounted for by his omnipresence: But matter reciprocally exciting motion in matter throughout all space, the idea of which reason had brought forth, was not so easy of explanation; was contradicted by the plain truth of this dogma, which enjoyed the applause of common sense; and was slow of faith. We may suppose Galileo before the Inquisition was wholly incapable of convincing his judges of the truth of this great law of matter, which he had demonstrated, and his reason felt.†

This dynamical property resident in all the molecules of bodies, which excites reciprocal motion in them, however remotely they may be situated from one another in space, though completely beyond the field of all research, has not remained secure from the conjectures of philosophers. Des-

* In his *De Stella Martis*.

† From Laplace, *Expos.*, p. 352, I extract the oath prescribed to him, the terror of ignorance, the future terror to the rulers of nations. “Moi, Galilée, à la soixante-dixième année de mon âge, constitué personnellement en justice, étant à genoux, et ayant devant les yeux, les saints évangiles que je touche de mes propres mains; d’un cœur et d’une foi sincères, J’abjure, Je maudis, et Je déteste l’erreur, l’hérésie du mouvement de la terre.”

In an article on his life published in the *Lib. of Use. Know.*, Mr. Drinkwater states, that both Galileo’s and the book of Copernicus, *Nisi corrigatur*, were still to be seen on the forbidden list of the Index at Rome, in the year 1828. President Lyell, however, informs us, he was assured in the same year by Professor Scarpellini, that Pius VII., a pontiff distinguished by his love of science, had procured a repeal of the edicts against Galileo and the Copernican system—That the late Cardinal Toriozzi was desirous to wipe this scandal from the church;—the repeal was carried with the loss only of a single vote;—and that, long before this time, the Newtonian theory had been taught in the Sapienza, and all Catholic universities in Europe, with the exception, perhaps, of Salamanca.

cartes conceived of whirlpools or vortices of subtle matter, in which he placed the heavenly bodies, and by which he accounted for their motions. Newton suggested interplanetary media or æther; Hutchinson and his school, the alternate rarefaction and condensation of the planetary atmospheres by the solar flame. These views make the power of gravitation purely mechanical. Laplace regards attraction as a radiating power; and from some circumstances connected with the secular equation of the moon, conceives the velocity of its transmission from one body to another is fifty thousand times at least greater than that of light.

Mortals would see the fountain, which supplies the universe with motion; may be transported by the pleasure, the insanity of knowing; lop off and fritter away the work of the Infinite Mind 'to fit it to the narrowness of sense, but the mechanism of attraction still remains a profound secret of creation. Motion is truly measurable; but mobility is immeasurable, incomprehensible.

Impenetrability.—Impenetrability, one of the great, functional forces, like molecular attraction, is a local property of matter. So energetic is its action, in the opinion of Mr. Locke, that, if all the bodies in the world were pressing even a drop of water on all sides, they could never overcome it, and approach in contact. It exists in, and is exerted alone by the atoms. The spaces between them in bodies are penetrable; and on their proximity or remoteness, all the modifications of solidity depend. I believe it is generally admitted now, that the molecules of most all bodies may be made to approach more or less; or that bodies very generally are compressible. By the ingenuity of modern chemists, we know many of the gases always existing heretofore in the gaseous state, have been compressed and made to assume the liquid form. It is the spaces alone, and not the atoms, which admit of compression, since, by the law of their impenetrableness, each must ever exist, and occupy its own place separately.

While mobility, or the law of universal weight, relates directly to the extension and evolution of time, impenetra-

bility looks to the extension of space. From the observation and generalization of facts, we can but perceive, our material economy is connected in the most absolute dependence, all its parts exhibiting the most complete adaptations and symmetry; that nothing is accidental, but that their different magnitudes and positions, their qualities of opaque and light-bearing; all their forces were calculated by the truth of original geometry. And since they pass through continual changes, this original order of necessity is to be maintained. The physical laws, of which impenetrability is one, combine in their operation, as I have said, to this end. Let us suppose the action of impenetrability to suspend, while the other active forces continue on. These bodies contracted or shrunk to mathematical points,* would persevere in their motions, but their order would not be the same, since magnitude, as the effect of porosity, modifies the universal weight. By its equable action, their great magnitudes are maintained always the same, and the motions of the celestial horologe kept steady. Since the different densities or magnitudes of the heavenly bodies are fundamental elements in their mechanics; or since magnitude alone modifies the distance, which, with the quantity of matter, modifies the universal weight and the centrifugal energy, impenetrability by acting on space, makes it functional in the economy, reigns an empire force, and helps to preserve its eternal order. It is, as I may say, a principal essence of matter, and the fulcrum, on which all its attractions act.

REFLECTIONS.

Philosophers regard some of the great movements in nature, very appreciable in the satellites of Jupiter and the moon, as having partially ceased, and tending still to dimi-

* To our perceptions, impenetrability is the most conspicuous as well as the most peculiar property of matter, which distinguishes it from other natural existences. It is therefore strange, that Dr. Priestley, who manifested much acumen in his chemical researches, should have attributed active impenetrability or extension to mind. Nature unites the two in one movement, but does this mental extension help any our comprehension?

nish, their causes discontinuing to act, or acting with less vigor now than in ancient times. They consider that movable sea-water or rolling oceans, cacuminal inequalities on the surfaces of the planets, other quietable conditions, must have occasioned great librations or oscillations in their first movements. These waters, in progressive time, if these inequalities may not smoothen, would naturally tend to an equilibrium, or quiet with other causes, which would diminish the oscillations, or secure greater regularity to their motions. Some of the causes, therefore, which agitated the planets in their early movements, have tended to equilibrium, and, in proportion, their action quieted.

We see the great masses of matter are making ceaseless revolutions in space, while the atoms are traversing an ever changing, renewing series of fugitive forms. This latter phenomenon appears due to the inequalities of the attractions of the atoms in different bodies at their first formations, which has continued, and subjected the atoms, in their mechanics, to continual librations or oscillations in all their morphogeny, or changes of form through which they pass. In the determinate, dynamical conditions, to which nature has subjected these atoms, does the operation of their attractions, in the series of ages, tend to equilibrium? Are their oscillations in the transition of forms like those of the early planets, growing less; or will ever all the highest ratios of their attractions meet together in the same forms, and they remain always permanent?

These are vast inquiries, problems, which demand for their solution durations of time much superior to those of all our ages; and an accumulation of observations unknown to all philosophy. There are some facts in favor, and some opposed to this ultimate equilibrium and quiet of these predeceous atoms, engaged in an eternal struggle, war with one another.

Facts in favor.—There are some of the material forms which are known to have remained unchanged since beyond all history. Strabo, all antiquity, speak of the sandy wastes of equatorial lands, these hot, burnt embers of the sun still

burning. In the extreme Boreal and Austral regions, where all chemical movements are extremely sluggish, we may suspect the forms of matter to exist in great fixedness. The geognosts regard a certain order of rocks, on which the earthy layers rest, as *primitive*, stretching back through the annals of unknown time. We know the molecules of gold, silver and some other metals, manifest but little appecency, capability of attacking other substances, or of being attacked by them. In his Political Economy, M. Say mentions some of the precious stones of extraordinary size, in the possession of some of the reigning houses of Europe, which have not lost their beauty and value in a thousand years. Cuvier and Brogniart consider the bones of certain animals as very little susceptible of changes by time. In all these bodies, and perhaps many more, the molecules appear to have reached the quiescent state. It is not, therefore, strictly philosophically true, that, *Omnes labores naturæ magnos delent dies, quos detulerant.*

Facts opposed.—We observe the molecules of some bodies are held together by so feeble an affinity, that they vanish almost as soon as they begin to exist; in their duration are ephemeral in the extreme. Phosphorus, as I have said, cannot be native at the thermal rates of the planet, but requires to be reduced, and preserved by art. If the chemistry of the arctic and antarctic regions is quiet, and matter there enjoys a great share of chemical repose, this want of activity is compensated under the temperate zones of the world; and, if the sun controls in the orbitary motions, he shows himself the right arm of all operative, chemical power. So great, indeed, is the despotism of heat alone, or so great is the dependence of the constitution of bodies upon it, that they appear little other than the mere creatures, evanescent phantoms of its frantic motions. They are solid, liquid, or ærial, as its proportions vary; nor can we tell what they would be in unknown high or low temperatures.

If other causes hindering the equilibrium of the molecular attractions, should disappear, the periodical returns of the great flame of the sun would be sufficient to stimulate their

rebellion. Besides, oxygen itself is known to possess almost an universal affinity to combine with the elements of bodies. Like the lion and the eagle among animals, it can prey upon them. Such an agent in nature alone would appear incompatible with their permanent rest. With all the active, disquieting forces, it is, therefore, highly improbable, the molecular attractions will ever reach repose, and the material forms attain to greater permanency than they already possess.

Even if the native attractions all tended to this permanency, the cause of organization would operate detrimentally. This cause, however, acts only on certain forms of matter, which, according to Sniadecki,* are the true *viable elements*.† The susceptibility of these elements of the vital attraction, or their passage to the living state, may be considered as one of the final sequences, for which matter at first was distributed in space, and the great movements, we have passed in review, were established. Of this final sequence we can know something. Mind does not come forth to exist in nature by its own power; we see it evolved with life to hold peculiar relations with the Divine Creator, and be eternally active in the enjoyment of his goodness, or his justice. Of the other great final sequences, which lie concealed in the stupendous volumes, eternal motions of worlds, in the compages they form, we are in the most absolute ignorance. Matter is visibly undergoing a vast labor in space, and we may suppose, tending in proportion to productiveness.

The molecules of the *viable matters*, which constitute but a very limited portion of the earth, cannot repose and life progress. We, therefore, conclude, finally, if a greater number of the azootic forms, as the equatorial sands, the primitive rocks, the precious stones and metals, may arrive,

* Vid. *Theorie des êtres organisés*.

† Since *gen* or *gene* from *γενωμαι*, I produce, is one of the chemic terminals, and vital chemistry is in common use, we should think *biogene* would be more in the fashion of our modern nomenclature.

in future nature, to greater stability, the *viable elements* must continue to play in the living whirlpool.

CHAPTER III.

PROPORTIONS OF MAN WITH NATURE—HYPOTHESIS OF THE CO-EXTENSIVENESS OF ORGANIZATION AND LIFE WITH MATTER.

SOME philosophers, egotists, regard the world as having been formed exclusively for the use, accommodation and enjoyment of man. It is a throne on which he sits and exercises his sovereign authority over the lower orders of creation. He came forth at his birth a crowned head for the inheritance. The tuneful Pope sings this egotism :

“Ask for what end the heavenly bodies shine,
Earth for whose use ? Pride answers ’tis for mine,
For me kind nature wakes her genial power ;
Suckles each herb, and spreads out every flower.
Annual for me the grape, the rose renew
The juice nectarious, and the balmy dew ;
For me the mine a thousand treasures brings ;
For me health gushes from a thousand springs ;
Seas roll to waft me, suns to light me rise,
My footstool earth, my canopy, the skies.”*

We see a definite series of animated existence, all connected together by traits of organization and function. Of this series man is simply one of the extremities; his foot presses oppositely to that of the zoophyte. Whatever perfection he possesses, must be shared in proportional degree by the other parts of the series. Some, as the eagle, the horse and the dog, in the exercise of particular senses, are his superiors; but in the excellency of his structure, general sensibilities, and resources of his mind, he prodigiously

* It looks strange, at this time of day, that the author of the *Divine Legation*, Warburton, should have defended the *Essay*, from which these lines are taken, against the just censures of Professor Crousaz. If the poetry is Pope’s, the philosophy manifestly is Bolingbroke’s, so detrimental to the good of the world.

excels them all, leaving a visible space between him and his nearest neighbor—space which separates between humanity and brutality—brutality, the inferior humanity of his inferior kindred. Like him, none of them hunger in thought; pine after the ways of nature; plunge her immensity seeking their God; know her proportions of past and future; lift up over her the horizon of philosophy to encircle her great form; aye, pass beyond her to look at the naked Uncreated. None of them burn after the phantoms of glory, immortality—the things plastic fancy has shaped;—sigh eternally after new pleasures, contriving, cooking, tool-making.

But if he derives these superior excellencies from the greater perfection, tunefulness of his structure to respond more actively to the laws of organization, and the governing laws without, in the same proportion, this excellency subjects him to the action of unhealthy, atmospheric meteorizations, to the action of a greater number of causes of pain, sorrow and death.

Like many of them, he is predaceous; his teeth look to carnage, and the tearing of flesh. If the world was made for his special use, many of them more voluminous than he, are armed with much greater fecundity, outweigh him far in the amount of actual being, and have usurped his rights. Many are privileged with longer life. If he be the great object of formation, why is there so much rich soil buried irrecoverably beneath the waters, so many inhospitable shores, marsh-miasmatic, poisonous regions, uninhabitable heights, frozen lands, sandy, rocky wastes, frightful deserts? Why is the terrestrial crust in the progress of geological changes incompatible with the unity of his existence, which, in the vicissitudes of ages, if geological science be the true light of nature, may operate his extinction, as they have done for many of the Edentata, and others of his near neighbours? Why does he dwarf toward the polar circles, and sink into brutishness under the equatorial heat? If he is a sovereign he is a slave to his passions, and to procure frugal subsistence, his royal hands are required to labor incessantly. If the

earth be his inheritance, why are the Indians of the two Americas, under the exterminating action of civilization, passing away, soon to strike from the living calendar? In like manner, under the desolating light of letters, or the power they place in the hands of a portion of the species, all the barbarous nations of the other three parts of the world, who will not, *can not enlighten*, not very futurely, must become extinct. And finally, according to the geognosts, other creatures long enjoyed the earth by themselves before his appearance; why if for him, was his arrival so late?

Man has his fixed limits in nature, and constitutes only a solitary item in the great sum of things, which make up his world. If the grape—the *Pomonal* and *Cereal* fruits ripen for him, they ripen likewise for other creatures, which have as grateful a taste as he. Suns rise simply and light him, but *rise to light him*, violates all his proportions.

According to the law of reciprocal dependence, the universal law of the equality of action and reaction, the quantity of matter the earth contains, must bear certain relations with the amount of organic existences she nourishes. Man, like the other parts of the living series, enjoys his share of her good, and her evil; and like them, is connected with the heliarchy or our system of matter, by the universal laws which govern all. It is through these laws alone he can lay claim to the privileges of the sun and other stars, or upon them, all his use and enjoyment are founded. So far indeed from being wholly devoted to the good and comfort of our lives, may they not have other lives of their own, which it is their special, primary province to cherish?

LIFE UNIVERSAL.

The same phenomena, conditions, belong to all the planets of our system. They all move in the same order round the sun; turn alike on their axes with their satellites to warm their entire surfaces at his great fire—fire which counteracts the cold, which must be prodigious, and universal throughout nature. If the earth is enveloped with a vivifying at-

mosphere, seas roll on her surface, the tendency of discovery is, that they all have the same atmospheres, the same seas. The same laws co-ordinate and sustain all in the same movement, the same things appertain to all constituting the idea of system.

If the great laws of motion are identical in each, so are the local or molecular attractions. Different philosophers, at distant places, have seen the same volcanic flashes of the lunar mountains. It must be the same would be visible in all but for their distance. I have already mentioned the corpuscular repulsion of day-light from the sun and stars. Like the earth, all the planets and their satellites reflect the solar light without the heat. Their molecular attractions must be the same as the earth's. In space, therefore, they are chemically and mechanically the same with her. They all, like her, have the same prelusory conditions indispensable to vegetality, animality—all that is cosmically necessary for animation.

The earth has life—offspring of a separate force of local molecular attraction, which causes organization. They, too, since they possess every thing prelusory for the development, and of a piece with it, must have this force, although it cannot manifest itself to us by its acts, at such great distances, like the force of the chemical attractions in the lunar, volcanic eruptions, the reflection by the planets of the solar light simply, et cet. If the other planets, since they possess all the other attractions, the attractions which nourish, make life possible—all the preparations, provisions visible to our reason—have not this local force of vital attraction, no life, what an *anomaly*, what a *hiatus* of nature! To what end does the sameness of the conditions of all, do these provisions, look? If vitality is one mode of productiveness, what is the volume of the earth by the side of all her fellow stars, not to say, by the side of all the bodies in space? Her life is a part in her creation, it must be a part in them, since the same conditions exist in them which make it proper for her, and by which she supports it.

Besides, the moral of things indicates this life. The evo-

lution and maintenance of intelligence in nature, manifestly depend solely upon this local, vital attraction of matter. Intelligence, a form of being assimilated to the Divinity—an energetic, physical force, which reacts immediately upon Him; examines to some extent, his labors; knows his will; offers him homage; follows after Him; plays eternally in the attraction of which he is the centre.—Intelligence, for whose good *here*, Heaven has labored, so much revelation been given to guide and strengthen its action enfeebled by sin, but elsewhere, may pour its rays of love freely on this unclouded centre. The rays which cover the heavenly spheres, can not be their true beauty and glory, but these rays of love, invisible to our organic senses, seen only in reason, which they shed, as the temples of the living doing homage.

Since, in the great dynamical order, intelligence or mind is subordinate to the vital attraction of matter, and this attraction is sustained by other material movements, intelligence is the mature, mellow fruit of our world, one of its great ends achieved, one of the ends of all its attractions and arrangements. The other planets participate in the same attractions and arrangements; the matter of their surfaces too must organize; they must be supplied with life and thought, be vocal in the hymn of universal praise. And since the sun, with all his planets, manifestly has a motion toward the constellation of Hercules, it is in the highest degree probable, that the same dynamical order holds throughout; and that organic, intellectual life is coextensive with the existence of matter in space.

If the great moral of things points to this life, point not less certainly to it the perceptible order of facts, the habits, conduct of nature. She is always simple in her first efforts, operations; but as she advances, she combines, widens in her action, and spares her means. She builds the thought of Laplace out of the same material as the zoophyte. But in getting from the simple structure and sensibility of the zoophyte to him, through how many forms of organization, through how many shades of growing thought does she pass? The action of the sensibility of the one puts it only

in alimentary relation with the spot, where it subsists, the sensitive action of the other expands throughout the universe. If she spares her means, she lavishes in their production, her effects always complicated, voluminous, bearing no proportion to the causes employed. The most rigid, exact uniformity characterizes all her labors. So that could a creature with a pulmonary structure descend from Jupiter, it would testify more for the existence of his atmosphere, than all the lights of science ; it would be proof.

Matter, in the hands of nature, is the first principle of all life, matter animated with motion simply, is its three-fourths. This motion combining with another from a new source, is life itself, the voluminous, complicated effect from the simple means. How diversified, how numerous its phenomena ; how great the distance passed over at once by the aid of a single material—the distance between matter crystallizing, playing in its own attractions, and matter organizing through limited durations, organizing into definite forms in the same body to achieve definite ends or new enterprizes designated by vegetality, animality ; other schedular, embryotic bodies emanating from them, to pass through the same durations. But nature here is not yet exhausted in production from the same means. She advances on with this action, simple at first in matter, but now complicated in life, makes another step, unites with it a new action from another new source. This *modification* or motion thus complicated is *operative mind* ; the action *widened*, the effect *augmented* from the fewest number of means. The number of words in civilized languages sufficiently shows the vastness and diversity of its phenomena, and the distance at which it is removed from other beings.

We see in all the planets these first motions, which progressed, become life, and ultimately, intelligence. Nature in all is the same ; she could not in them have fallen short in productiveness ; abandoned her plans, the characteristic uniformity of her labors. Her moral, the order of her facts, her visible operations, proclaim the universality of organic life and intelligence.

In the infancy of geography, nations seated upon some archipelago, considered their bit of country, as the only inhabitable region of the earth. So it may be, in the infancy of our philosophy, we look on the sphere of matter, where our lives have been cast, as the only realm of social life and pleasure; and, not knowing, never dream, that other mortals, in the countries of other stars, are pressing forward in the discovery of the laws of the same nature, advancing in the arts, which procure elegance and pleasure, and passing through spaces of existence, measured out to them by the motion of those stars.*

The molecular attraction of life we see, is extremely sensitive to the action and influence of external or local causes. It is connected in direct dependence with the solar effusion. It varies or modifies as this effusion is modified by the figure of the earth and its airy involucrum. The earth is but a speck in space; how short is the arc of one of its meridians; yet how does organization vary to fill up this arc? Plants are indigenous; animals, native in climates. There is rigidly an arctic and a tropical phytography, zoography, the extremes, with all the shades which unite and fill up between. The isothermal lines sweep through, and divide, almost upon the same spot, the different, living orders. How tightly does nature draw the cinctures of space as well as those of time, about these her living orders?

And it is allowable, had the earth been twice her volume, twice the number of these orders had been required to fill up her climates. Jupiter, all the larger planets, therefore, if our speculations here conduct us right, and the analogy of nature is to be taken for guide, nourish a greater diversity of life, proportional to their magnitudes and climatiferous

* Fontenelle, with the reason of fancy, has described, with accuracy enough, the customs, manners, personal appearance of some of these *astroïketoi*. The nymphs of the star that cheers our night, we are to suppose, excel in fairness all those, that have been seen by the Muse of Anacreon, or blushed or wept in the fancies of Boileau and Racine. One of our lovers might forget the disquietudes of the *saucia corde*, which terrestrial beauty inflicts, on beholding them.—(Vid. Plurality of Worlds.)

conditions. Since the fire of the sun darts round him into the depths of space in straight lines, this fire must become sparse or more feeble as these depths increase. According to calculation, the temperate climates of Jupiter must correspond to those, which border on our arctic circle. Our Esquimaux, all those nations which inhabit Boreal Europe and Asia, all other things corresponding, would find in these climates a comfortable abode. We may suppose a gradation of climates from Mercury to the star of Herschel, varying upon an irregular scale, according to the inclination of the planetary axes, and constitutions of their atmospheres, demanding of the great, living force, new efforts, new organs for new functions, for new living forms, to accommodate the varying conditions of matter. While the laws of nature demand the most rigid, inflexible fixedness in these conditions, we see our great life everywhere plastic, everywhere bending to the all-powerful influence of these conditions. This vital plasticity is a law of nature; it must reign her resource throughout her empire.

But the vital attraction elaborates its own fire, and shows itself independent, in certain limits, of the action of all external ignific and frigoric causes. All organic existences have a temperature essentially their own, which nowhere corresponds to the media, in which they are immersed; yet, as intimated, it must be conceded, the solar fire regulates the intensity or the rates of the great, living action, as the fecundity, gigantic size, the vast abundance of the living forms of temperate climates, contrasted with those of the polar regions, sufficiently testify. If we conceive the living power of generating heat to increase to the extremities of our system, in the same ratio, that the solar warmth diminishes, vital, organic bodies of the Georgium Sidus, star of Herschel, may enjoy the same temperature as those of the earth. And if we conceive further, a still greater disproportional augmentation of the heat secreting functions to be compatible with living races, and progressed to this star; and the material forces, which war against the vital attraction, to grow weaker, as does the sun's force, of which pre-

sently, then the Herschelians may possess a warmth exalted prodigiously above that of any of ours.

Under such an arrangement, law of nature, this star, which our clouded, unlettered fancy presents to us so unfavorably situated, so far as the great want of heat is concerned, may be the abode, the Paradise *unruined*, where the beautiful, noble descendants of another Eve, with a category of subordinate lives, have passed through infinite generations, amidst naught but boundless ease and pleasure. Their bodies thus animated, with those of other creatures, in the decayed, expiring fire of the sun, would melt and dissipate the ice, which otherwise would eternally fetter their world; excite in it the movement of the Ausonian breeze; impart genial warmth to the earth and atmosphere; and ripen the Hesperian fruits, with which they are nourished. These fruits would perpetually ripen, since the summer, in which they opened their flowers, would be perpetual, emanating from the same unvarying source of living fire.

New forms, new combinations of existence would present to science new routes, and unveil thought in an infinity of novel and beautiful shapes. The scene of reality, of imagination would be not less boundless; the song of the Muse not inferior in sweetness, grandeur and elevation, to that of our earth-worn harps. It is, therefore, not without some reason, that the spirit of our poetry and romance delights to soar to these worlds to catch the breath of a fresh life.

If we conceive the organic orders of Herschel to permit their circulatory and pulmonary systems to be greatly developed above those of our lives, and their atmosphere to be charged with a greater proportion of oxygen, this living fire so operative would be evolved, and exist in them in the same manner, and by the same laws, as in ours. An increase in the organic and physical means of the vital fire proportionally to the distances of the planets from the sun, other conditions being the same with the earth, would constitute them all equally inhabitable with it.

And if the solar flame regulates the rates of vital attraction, it is extremely probable, it regulates likewise those of

the chemical activities, that these activities diminish from the centre to the extremities of the system. The universal weight—forces weaken to these extremities. We know not their proportions with the local attractions, but it is highly probable, as I say, the latter weaken in the same manner; and that matter, in all its energies, grows universally more sluggish, as the distance recedes from the sun. The increasing porosity of the planets favors this view.

The molecules of all bodies, we know, attract one another with a definite force. The vital attraction has to overcome this force; it is therefore a dead weight it carries in forming the living tissues. But if it be a law of nature, which it appears to be, that the molecular attractions or this dead weight diminishes to the last planet of our system, in the same proportion, every thing equal, the vital attraction unchanged—and since immechanical, we see no reason for change—would increase in activity to this planet. But the sun stimulates, regulates its energy. If, therefore, from the loss of his influence, it weakens on the face of the planets, as they recede from him, it gains strength proportionally by the diminution of the opposing attractions; and may be regarded everywhere as of equable fulness.

By modifying the organic laws to accommodate the different conditions of matter, as it exists in all systems, we may think nature has supplied all with life. What a variety of modifications has been necessary to accommodate our planet! What infinity of organizations with special, vital properties, functions, to supply suns, comets! Man cannot alone feel, think, philosophize, and die. Myriads on myriads of beings must participate in the shades of his form and thought; immensity, on both sides of him, peopled.

The revolutions of the stars proclaim, demonstrate death for all. Life, ages fly away in proportion to their velocities; new ages come; a thousand centuries of centuries, a moment, but the same mature old age, counted where they correspond. There is an universe of life and intelligence, as well as of matter, advancing in rapid haste to an eternally receding futurity. This universe has but one great motion. If the

affections and the thought of man terrestrial do not answer complexion with the affections and thought of man in Saturn, or some star, they must answer, and be united at some other point; and the stream of his life, flow into the same great ocean.

Davy,* philosophically dreaming, conceived of organic intelligences, resembling somewhat our *proboscindiana*, endowed with superior philosophical powers soaring above the amber clouds. Infinitely beyond these clouds, and the sphere on which they cast their shadows, in her intellectual municipalities, who can tell, in what shapes nature may mould the feeling heart, and the sublime power of investigating thought? The dreams of philosophers, the airy forms of imagination, could her labors be explored, with slight alterations, might become her realities.

How long, how varied is our living chain?—How diminutive the earth to necessitate such diversity to accommodate the varying conditions of her matter! Man only in our day begins to look upon the great scene of the life she nourishes. He contemplates it with wonder; begins to behold it in the great mirror of time; roll away the night of years, that has fallen upon it; and gather up all the scattered lights and shades, which form its mighty picture. New Holland, more recently perhaps than some other countries from the bosom of Neptune, presents new organic types, which have demanded a separate place in the nomenclature of natural history. The living forms of the Eocene and Miocene periods, look to land and water or their mixture; are stamped with the seal of chaos. The lives of New Holland, in distant, future annals, may contrast as greatly in shape with them, that occupy, at present, her surface, as do now the lives of other countries, with those of their own kindred, on which the light of Aurora first shone.

If, therefore, New Holland presents new species; if such enormous diversities and changes in the organic types are necessitated to accommodate the varied, varying states of our terrestrial matter, what diversity, what changes—how

* Consolations in Travel, p. 64.

much must these types diverge from ours, and from one another—on the face of all the planets. And, to accommodate such immense masses of matter, as the sun and fixed stars, many of which visible to us, may have shone myriads of ages before the flight of our spheres commenced, what still infinitely greater varieties, decays, renovations, revolutions, of vital *morphogeny*?

We look upon the universe, as a given, unvarying quantity; a fixed and finished form. Where is the Force, which anciently upheaved it from nothing? Has It become drowsy—fallen into profound slumbers, from which It never wakes? Can we conceive Omnipotency at repose? Must not the cause which produced worlds, at first, still tend to their production? Have the skies not their veritable antiquities—the proportions of new and old? Do not young stars blend their rays with those that shone before our chaos? In the age of ages is there not a progressive order of changes? Stars appear and disappear. The star discovered in Cassiope in 1572 by Tycho-Brahe, shone with great brilliancy for a short time, and since has been lost in the depths of space. Philosophers discover alterations occur; new scenes, vicissitudes take place in the great field of space. Laplace* proclaims that new events are transpiring in nature, and that she is not always the same. Cuvier, with the most admirable sagacity, has demonstrated, that there has been a succession of lives upon the earth; that the ancient organic forms have perished: and life on her actual face exists in new shapes. The divine sages teach us great, future revolutions of the world. The telescope of Herschel revealed, the powerful telescopes reveal in the profound depths of celestial space, floating clouds of matter—new chaos. Some portions of these clouds or nebulosities appear more condensed than others, presenting nuclei. These nuclei, in the progress of time, appear to become more luminous. Human reason looks on those clouds as points, where creation is still progressing; these nuclei, as nascent orbs of future light—material existence beginning, begun with the feeble move-

* Syst. du Monde, p. 392, supra citato.

ment, which, in its expansion and fulness,—will stamp on life the appropriate forms of organization, on mind the suitable sensation and thought ; and, in the age of ages, in the great revolution, be what kindred stars and systems are and have been.

CHAPTER IV.

PHILOSOPHY—NATURE—OF ANIMATED BEINGS.

IN the preceding chapter, we have been compelled to anticipate many of the generalities of the philosophy of animation. We have seen that the sun exercises the most despotic power over all vital morphogeny ; that the organic acts or functions are more complicated in origin than the acts of an organic matter ; the intensity of these functions quadrates with the intensity of the chemic and cosmic forces ; that the living forms are every where modified to accommodate the varying conditions of matter ; and that these forms are not only co-ordinated in their own system, but sustain the most strict and rigid relations with the great order of the material universe.

Thus the farther we advance in the study of natural beings—the nearer we approach the great interior of nature's household—in proportion the more complicated become their properties and phenomena ; and, in the same proportion, they recede from our research. Finally they vanish away from us, and hide in the dark shadow of their first creation. In our advance the forms of beings we meet with are new, but not all the materials. The old materials are brought forward, new ones with new forces to modify are added, which give new contours to fresh ranks of multiplying existence. Nature prodigal lavishes existence, but in so doing loses nothing. Whatever power she expends, whatever she moulds into form, she gathers up, and carries onward with

her to be employed in the fresh operations and enterprises of her creative art.

Thus, in the chemic atoms, we behold forces for the production of the corporeal forms, the consuming of space, the preserving of distinctness, for their impulsion through endless changes—all that is necessary for their own economy. Life is a movement in which they play a part so conspicuous, that its idea is inseparable from them. They stimulate primarily to all intellection. So far we can trace the sequences of these forces. But here they abandon us; we can keep up no longer; they vanish away to be active in the great order which regulates all material efforts. Their course is still onward, although we cannot trace it, for our reason assures us the action of nature is but one.

Now here, in living bodies, we meet again these same atoms. Plants and animals differ so much from mere mineral masses, that had we not been apprised, we might expect to meet in them every thing new. But nature, as I have said, gathers up the old materials she had used in one form of being, and carries them forward to be employed in the new. It is the same atoms, but here, in this new form of animated existence, they have changed the order of combination. They no longer form homogeneous masses; evolve their binary compounds; and crystallize in angular shapes, fitted merely for juxtaposition or stratification. Their manner of union is now only tertiary or quaternary; and, the forms altogether different, endowed with new properties, are adapted to new impulsions, influences, the sphere of activity altered and infinitely widened.

How rapidly do the mineral and animated forms diverge! The one looks merely to stratification, a place to rest snugly in—its essence repose; the other, to impetuous worlds for excitement, to which the face of its organs are set, death the only quiet. But notwithstanding this divergence, and prodigious augmentation of capacity of the living forms, and of their relationship, all is not remodeled, changed. The atoms still exert several of their old forces, the same as in the mineral state. Vital bodies occupy space, gravitate to

the earth's centre; some of the tissues exercise elasticity, and all are porous. They enjoy too aggregative attraction, but the manner is altered.

The angularity of mineral bodies adapts them to cubic or solid extension; all their motions are mechanical or attractive; their life, I may say, is simply geometrical. Each component part is active, instrumental in producing motion. The motions of organized bodies, contrarily, do not arise from all their parts, but from a solitary, innate principle, excitable by all the other bodies of nature, and by thought in volition. Except in the bones of animals, the mere fulcra of support, all the motions are perfectly immechanical, and the life, ungeometrical. They both, I say, enjoy impenetrability, extension, porosity, gravitate to the earth's centre, et cet. Whence, then, comes this divergence in the two sorts of bodies?—the plenary mode of combination, and uniform homogeneity of substance in the one; the assumption of the tertiary or quaternary mode only, and heterogeneity in the other; in the one, the monotonous angularity of figure looking to snug location, and the sources of movements, mechanical impulse and the varied attractions; in the other, the variation of figure through the zoological series, each separate part of an individual existing in functional relation to the whole, and the source of movements, not attractions, but an unique power, common to all living, but foreign to all mineral bodies? But whence comes this divergence, the difference between the two? The same causes operating, *cæteris paribus*, must always produce the same sequences. Here the sequences vary, the causes have varied; the sequences are not all changed, the causes have only changed in part. A new cause, therefore, has been superadded, which produces the new modifications in the original properties and phenomena of bodies manifest in the living forms. And plants and animals are something more than the mere modes of material existence.

Abstract power or force is inconceivable; this new modifying cause is *substantive*, upon which we have already insisted. All that we know of its nature is, that it is the

great functionary of all life, the evolution and conservation of all its forms being due to its operations. *Heu quantum nescimus!* What are all living things—their properties, qualities, and phenomena—but a combination of effects of anterior causes known and unknown—the mutations, metamorphoses of what was, progressing new modelled?—Mere existences beheld at one stage of their progress, visible only in one speck of time! Contemplate the ovum of the *Diptera*, a minute atom; now it is a moist, disgusting worm, but now it mounts the breeze, and its wings flutter in a glory of light and shadow, which would immortalize the second time the pencil of a Rubens or Vandyck. Meditate the semi-pelucid drop, in which man enjoys his first existence. Now this drop is a squalling infant; now ambition inflames its heart; the noise of fame astounds its ears; glory dazzles its eyes; nature soothes it with her sweet inspirations; now it presses hard up the steep of knowledge, or with burning numbers fashions immortal song labouring for the remembrance of posterity; or with sinewy arm seizes the sword; scours the field of war; snatches victory in the tempest of blood; now it is a putrescent mass noiseless except in the expiring echo of fame; and now, if it have kept its true course, in its last metamorphosis, it will open its eyes to the insufferable splendors of its Divine Creator.

But this *drop* had only been food, that nourished the mother which had nourished indiscriminately the hungry millions before. How many distinct things make up man's totality, the sum of any animated being! Such existences, in the actual order of nature, are mere stages of being, of which we are permitted to see only some of the phases, their entire philosophy soaring infinitely beyond our resources.

SECTION I.

ANALYSIS OF THE LIVING FUNCTIONS—FUNDAMENTAL PRINCIPLES OF PHYSIOLOGY.

PHILOSOPHERS observe that causes behind us narrow up rapidly, while before, they expand to infinity. A few sim-

ple facts, principles, or causes, therefore, furnish the bases of all our sciences, so that knowledge always builds on the side next futurity. Thus gravity is the x of the unknown quantity, on which astronomy founds herself, and solves the problem of the celestial phenomena. Chemistry refers the constitution of bodies, changes of their form—all her truths—to the molecular attractions unknowable in themselves. The great fabric of geometry rests upon a small number of facts.

In imitation of these sciences, since Glisson, physiology has laboured assiduously to fix upon the first, irreducible truth, the x of the vital functions, out of which all the other truths naturally flow. But physiologists looking for the footsteps of nature so near the border of absolute darkness, have not agreed in what is presented to observation. Besides false facts and false experience, of which philosophers of all ages have justly complained, come to torment truth, and retard the progress of expanding light. Systems built upon such facts and experience in this science as in others, posterity continually labors to demolish, and lay the foundations on new bases; so that history presents the horizon of letters full of gloomy antiquities, mouldering ruins “nodding to their fall” reared up by former ages, to become even but slightly acquainted with which constitutes no small amount of scholarship.

In consequence of such facts and experience, and the difficulty of seizing upon the true facts of nature, in their generalizations, some physiologists admit one, some, two, and others three or more of these primitive, irreducible principles as the basis of the science; or as the last terms to which the vital phenomena can be reduced. *Contractility* and *sensibility*, *irritability*, *motivity*, *excitability*, *nervimotility*, and a host of similar cognomical expressions, many of which, as Bostock justly remarks, are merely expressive of theoretical views of authors, are received in the actual epoch as these terms. The difference of faith among great authors, is the strongest evidence, that these terms are not yet settled; and that the true analysis of the living functions, and the

first uninvestigable fact or energy of nature upon which they rest, in the fortunes of progressive knowledge, await the researches of posterity.

These *expressions* designate the properties of living bodies, either as existing in themselves, or in relation to the ambient media. *Contractility*, ultimately from *contrahere*, to draw together, expresses only a peculiar mode of motion. This sort of motion is very manifest in the action of the masses of the muscles; but are generation, the motions of the nerves in sensation, the motions of the parenchyma of the organs or capillary system in ultimate assimilation and disassimilation of the repairing materials, of pulmonary hæmotosis, et cet., by contraction? Certainly these motions are any thing other than contractions; and the greatest probability is, in the actual lights, that they are all by *polaration*, a type of movement abundant in nature. Since there is a constant intromission of foreign matters in all the organs, or since the organizing act continues without intermitting from conception till death, and the living body is composed of solids and fluids, the former of which momentarily expand, and contract to receive and expel the latter, *expansion* is a type of motion nature amply employs in the living organism; and, if *contractility* has claims to be a parent force of the functional phenomena, *expansibility* must likewise have claims. Contractility, therefore, which indicates all living actions to be by contraction, does not cover all the ground its inventors intended it to occupy, tends to mislead the understanding, and is an incompetent, infelicitous expression of a last term to which the vital phenomena can be reduced.

Irritability, excitability, stimulability—according to the construction of our language—mean, by their terminal syllables, *abstract power, power in repose*; relate to the ambient media, and imply that the living motions, whether in the interior or exterior of the body, arise or are communicated from agents foreign to the achieving organs. This mechanism of motion so abundant, reigns manifestly in the living economy. But are we prepared to say the acts which shape the organs,—evolve the embryo—immediately waste in

atrophy—all the *living acts*, are true *stimulations*? This action by stimuli is peculiar to organized bodies, strongly marks a distinction, as I have already had occasion to notice between them and all the other beings of nature, but is not the universal type of vital activity. The same objections, consequently, just urged against contractility, apply with equal force against all these terms.

Upon such views of the first facts of living phenomena, physiologists have predicated definitions of life. Brown and Rush considered it as the effect of stimuli acting upon excitability. In the vital acts, which elaborate phosphoric acid and lime; the attraction, which unites them into bone; in the combination of the nutritive molecules from the common torrent of the circulation into the various organic tissues, we see, as already intimated, no traces, either of stimuli or excitability; and that life must be something more than the effect of such action. MM. Bichat and Beclard avoided this Brownian error. “The totality of the functions which resist death,” the former regarded as being life; with the latter, it is the whole of the phenomena peculiar to organized beings. M. de Blainville very justly remarks there are almost as many definitions of life as there are systems of physiology.

Broussais, to whose researches future men must do homage, looked upon sensibility as a function; and made contractility and a living power of molecular combination the last terms, to which the phenomena of life can be reduced. With him and his numerous imitators, the vital or organizing force, which creates and co-ordinates the organs, is the first cause. Contractility is the only property of these organs evidenced to our senses—the second or immediate cause of the functions. Such is Broussais.

Since contractility and sensibility are inseparably seated together in the organs, and perfectly synchronous in their action, it is inconceivable how it can be determined, which is the *property*, which the *function* of the other, or that any such relation holds between them. In this respect, it appears to us, the subject is precisely in the same predicament

as the question between the British and Chinese philosophers mentioned by us before, *whether it be the North or South*, which attracts its respective pole of the magnetic needle.

Sensibility is the first material, organic condition, cause of all the intellectual phenomena, whose modes of activity MM. Condillac and Destutt-Tracy erected into the faculties of the mind. It constitutes the sole union between the mind and the living organism, and co-ordinates the material, and immaterial of us into one movement. If it is obvious to our senses, and we are conscious the mind acts in sensation at the moment the living substance of the organs is contracting, Professor Tiedemann, in a late work,* has shown, that the intellectual phenomena are modified or are subordinate to the molecular movement of these organs, or to nutrition. We cannot, I think, confound the condensation or contraction of the living substance with the movements of its chemifactions, or molecular composition and decomposition. Nature, then, has not limited the dynamical mind to the contractions of the organs as the sole condition. We see its phenomena modify with all abnormal changes or diseases. Consequently it puts forth its efforts not only upon the contractions of the living substance but upon all the changes, through which it organically passes. If sensibility, therefore, be a function of contractility, it must likewise be a function of the cause of all these changes.

Organic contraction is only one state or condition, in which sensibility is put in evidence. There are other conditions, as just shown, of the living substance in which it manifests its action. Can we connect contractility and sensibility in the relation of property and function, or of cause and effect, without combining other, even many causes for the production of the same single effect?

The too severe habit of abstraction, and rigid logic of Prof. Broussais, revealed nature to him here in this light. His mind drawing nutrition from itself, original, he felt little the authority of others. His reason created the ground over which he passed, gave to things new shapes, altered here

* Physiologie Comparé.

what was right, but righted much of what had been wrong before. Had his originality allowed him to feel more of the force of the venerable code of philosophical reasoning carefully drawn up and observed by Pinel in the composition of the *Nosographie philosophique*, which he so severely criticised, and justly censured,* he had probably given to this subject a different development.

It is only the plastic power of language, the mutations it offers to things, displacing their proper shapes, which transform and make sensibility into a function:—sensibility a primary property or law of the living organism, through which all its stimulations come—sensibility nature's provision for these stimulations. The order of facts, of which it is one of the ideas, proclaims and constitutes it a property. Sensations are not supposed to exist natively in the organs, but are referred to a cause existing in the organs, which generates them on the impulse or contact of foreign bodies. They are the effects of this cause or of sensibility, as the contractions are of contractility.

The human understanding, I may remark here, appears so fashioned, as of necessity, in contemplating the combined, the great continued action of nature, to always distinguish between the *anterior* and the *posterior*, so that the first or antecedent action, in the order of time, is the cause of which the second action or sequent is the effect. Thus the mind through the senses is conscious of sensations and contractions in the organs, but that which causes these two sorts of acts is not manifested to it like the acts themselves. Since the acts exist in the organs, it infers their unperceived causes likewise to be present in them, or to be their properties, distinguishes between the anterior and posterior of time, refers these acts to these properties, connecting them in the relation of cause and effect, and frames words for them, *sensibility* and *contractility*, suitably to express such relation.

It is upon such manner of seeing and distinguishing, the mind has framed all language. A heavy body, for instance, falls to the ground—the falling act is felt by the senses, but

* In his *Examen des doctrines médicales*, tome iv., p. 1. et sequente.

what falls in the body is unfelt. The mind associates the sensible falling act with the dark, invisible faller or gravity, in the order of antecedence and sequence. In like manner, for the same reason, since water boils and freezes, were it not plain these two acts depend upon the varying amount of heat this fluid may contain, they would be supposed to arise from some property or properties in it; and we should find, in all enlightened languages, words to express a *boiling* and *freezing* quiddity in water. It is clear, could the conditions under which the organism and all anorganic natures manifest activity, become obvious to the senses, as are those of these two acts of water, a great revolution would take place in the vocabulary of physiology and general physics.

But that such manner of formation strictly holds, is proven by the paucity of words in all barbarous tongues expressive chiefly of simple sensations. How strongly does the same language of any people become civilized, contrast with itself before and after the change? When letters, for example, began to acquire glory in Greece, and men pushed their contemplations farther out into nature, words generated with the rapidity of expanding thought. These new words expressed the recondite, hidden nature of things, connected the visible with the invisible; their language became immortal, and its words still live in all the scientific languages of the world.

The mind follows after nature in the inverted order of her movement, discovers new relations, and needs new words to express them, which it promptly invents. Soon it forgets their true meanings, and erects these *relations* or *properties* of things, *which are only the ways in which it sees*, into *beings*. Thus, in the mutations of languages, as I have said, sensibility becomes a function, or a property; in these mutations, untrue to the natural order, sensibility, contractility, gravity, et cet., become clothed with being, or misplaced in the order of nature's great continued action: And thus, man thinking in the ever-moving, fleeting duration of time, from the point of view at which he sees, drinks in the darkness with the light. And, although, in erecting his science, he

may be conscious that the vital properties are nothing distinct from the organs, but merely the organs themselves contracting, feeling,—that gravity, all the attractions of a body, are simply that body itself moving in various manners:—that the properties of all physical existences, in a word, are neatly nothing but these existences developing their actions in different ways, yet it is highly probable, however fortunate and happy he may be in futurity, he will never be able to invent a higher logic, and expel all such words from the vocabulary of his reason. They appear, since they figure in the history of his language, useful conveniences, and indispensable to him, from the point of view, at which he can only behold nature.

Nervimotility. Since, in the last ramifications of the nervous fibrilli, it is not improbable the nervous substance may be diffused through all the living molecules of the body; and since it is pretty well agreed that all vital movements are concerned with, or begin in this substance, *nervimotility*, first *formally* introduced into medicine, I believe, by Dutrochet, is the least exceptionable, as a name for the unknown cause of life. Whether this substance be diffused through all the molecules or not, sensibility in some form exists in all the living parts, in some even where no nerves can be traced by dissection, which Humboldt and other experimental physiologists accounted for, by supposing the nerves darted their influence to some distance around beyond their terminal extremities.

We are in absolute ignorance as respects the nature of the nervous action, and the extent, which, however, we know to be very great. The titles, consequently, of *nervimotility* to the higher rank, to which it has been elevated, are doubtful.

We cannot recognize, identify the living opifex. It is transmitted in the generating act, operates in the fibrous contractions, sensations, the nutritive molecular fluctuations of the living substance—in all the functions—suspends its action in death. The functions achieve organization; this is their end. It is before all the functions; contractility

and sensibility are only some of the known laws by which it manifests its efforts. It is a primary, energetic force of creation; moulds matter into an infinity of forms peculiar to themselves; and in their debris, leads in the revolutions of the face of our planet. With these forms self-combustible deposited in the bottom of seas and lakes, amassed in the bowels of the earth, it feeds the volcanic fire. In the sequel of its reaction on the world, it is a fearful, revolutionary power. Observe the slow but constant changes the operations of vitality are pushing forward in the matter of the globe—formation of solid, calcareous rocks from decomposed testacea and bones of animals, the gigantic, ponderous framework of mountains that are, and yet to be—production of new islands by lithific coral or madreporé action—changes, which constantly act, which have, which will ultimately act on the fortunes of future men, and alter the face of society with the face of the world.

Its action by organization appears to place matter in a condition to pass through changes purely chemical, through which it could not, but for its intervention and agency. The general tendency is to the *durable concretion* of its molecules, to the *hardening* of the general mass of the earth, as is manifest in the coal, the ammonitic, lias and other similar formations, which constitute so large a portion of the terrestrial crust. It is in this manner it becomes a cause of alterations; and, but for it, it is reasonable the geological face of our world had worn a very different aspect from what it does.

Is it by the great changes it produces in matter, it itself becomes changed in vast durations, and passes into types of organization altogether new? And from such changes will the great annals of futurity present a zoological series of animated forms, which shall differ as greatly and decidedly from all that now live, and will become extinct, as these forms differ from the gigantic, winged mammalia, reptiles, amphibia,—the children of the first earth,—which figure in actual oryctology?

We cannot know or name* the cause of life; its chamber

* Vid. Virey Puissance vitale passim, et quoque Adelon Physiologie de l'homme, tom. iv., p. 569.

is darkness. It is charged with the sacred ministry of affording life to the world; and like the forces of this world, with which it measures strength, continues on its action through interminable duration.

CHAPTER V.

LIFE OR VITAL MOTION CONSIDERED IN RELATION TO TIME, OR THE MOVEMENT OF THE WORLD.

BEINGS alone are nature's actors, the sources of all causation. The cause of life, which is truly motion, is one of these actors. The motions waste, but the movers, the frame-work of the world, persevere unwasted. Thus, since the origin, day after day has continued to plunge the gulf of night, age after age, that of the tomb, but days and ages are still on their eternal flight.

Accordingly, it is in the duration of time itself unfolding, the great vital force or mover unfolds its action in the perpetual evolution of generations. It is this stupendous action we are here to place by the side of that of the world; and ascertain, as well as we can, their relative value or just proportions. *Hei! veritatem naturæ sequentes, speramus, tantos superare labores.* And especially, when we consider, that our feet are planted on one speck of time, which measures at once our duration; that this speck is constantly dashing away with us, impelled by an ever-pouring torrent of similar specks; that if our world advances through such vast spaces per hour, we are whirled backward in the same proportion to the gulf of the tomb. A spectator carried but a mile per minute, we should think, before the most magnificent spectacle in the world, could be supposed to distinguish but very imperfectly the objects presented him. How then can we seize our proportions—behold ourselves in the great mirror of time! Yet how we love nature; delight to copy her great

images in our mind; feel their warmth inspire affection in our heart; to be near her; walk on her shadowy grounds, where the faintest ray of twilight only falls on truth, the communication even of which, M. Bourdon* has placed among our real wants! O nature! *magna corpora*,

Anges, homme, animaux, vastes meres, chaîne immense,
Qu' un atôme finit, que l' Eternal commence.

The subject of this chapter naturally decomposes itself into three; 1. vital evolution; 2. death; 3. perpetuation by generation.

SECTION I.

VITAL EVOLUTION.

SINCE life only progresses by organization, as the means, which is double, composition and decomposition, the manner of duration of the individual as of generations is by perpetual evolution. Decisive stages divide this duration of individual life into several distinct parts, ages, and unite them together, the continuity of existence going on through the changes unbroken. Thus he the same, who crawled after his toy on the floor, leaped up in the lap of his Corsican mother, leaped afterwards for empire; who wept for the loss of his plaything, did not weep for the blood, with which he deluged the earth, and the ocean of innocent tears he caused to be shed;—who trembled at the growl of the cat, his familiar playmate, waded through blood at Saragossa, shook with his noise the country where Scipio and Hannibal had fought, pushed the crown off the heads of her sovereigns; passed to Egypt, convulsed the earth under her pyramids, struck at the sceptre of her caliphs; cowarded death at Lodi and Austerlitz, and demolished the proud Kremlin of the cunning Russian.—So that the metamorphosis of the action, is not outdone by that of the organization.

In all the more perfect races got beyond the uterine stage, or in man, according to M. Adelon, this evolution is achieved

* Vid. *Principes*.

by eleven distinct species of actions or functions:—1. *sensations*; 2. *voluntary movements*; 3. *expressions*; 4. *digestion*; 5. *absorptions*; 6. *respiration*; 7. *circulation*; 8. *assimilations*; 9. *calorifications*; 10. *secretions*; 11. *generation*. These eleven sorts of acts, the immediate elements of vitality, conspire in their whole to nutrition and reproduction, or to the conservation of the life of the individual and the species; and relate to the same number of classes of organs which compose each individual of these races. They will group together into two or more orders, and refer to contractility, sensibility—the vital properties—of which they are esteemed the functions. To live, I have said, is to organize, to be nourished, which is to have internal sensations to solicit, perceptions to distinguish aliments; voluntary movements for their prehension; their digestion in a reservoir or apparatus; their absorption; their transmission to the pulmonary organs for respiration; their circulation by the heart or diffusion into all parts of the body for use; their transmutation into these parts or assimilation; their rejection afterwards; the maintenance of temperature; and finally, expressions for mutual co-operation, defence,—in our species, the right arm of civilization and exquisite source of pleasure.

Since function, from *fungi*, means to discharge or fill an office, in a good classification, each ought to have a special organ or apparatus as its achieving instrument. We may, perhaps, justify the number mentioned here, since each enjoys an individuality in the economy the organs form. Some organs participate in or have several functions; as the tongue; some combine to form one, as digestion, vocal language; while there appears no very distinct structure for the execution of other functions, as assimilation, calorification; the parenchyma, however, of all the organs must be regarded as their true seat and instruments.

Physiologists make functions by the combining together or separating of functions. They manifest the same dissonance among themselves in this respect, as in the vital properties, hastily glanced at in the preceding chapter. Haller, Viq-d'Azyr, Fourcroy, Chaussier, Barthez, Cuvier, Du-

mas, Blumenbach, Bichat and others, under the various relations they may be considered, modified their number, their names, or both; but the analysis of their enumerations presents nearly about equal values; so that either, placed to proper account, would be a pretty safe guide in the actual state of knowledge. Their number depends upon the number of living properties admitted. Haller recognized but two of these, *sensibility* and *irritability*, to which he referred all living phenomena, and on which he built the functions of his system. Viq-d'Azyr, Fourcroy and Cuvier established each nine functions, but Cuvier's are not the same as those of the two former. Chaussier, the venerable founder of *vitalism* in France, distinguished three fundamental properties of the organism, *sensibility*, *motility* and *caloricity*; and made eleven functions. Dumas recognized four of these properties, *sensibility*, *motility*, a *force* of assimilation, and of *vital resistance*, which he attributed to all living natures; and accordingly made out four classes of functions, accommodated to the ideas he conceived of them. With M. de Bonald, Buisson defined man, *an intelligence ministered to by organs*; and divided all the functions into two great classes—those which labor directly for his intelligence, and those for his material conservation. In the first class he grouped all the external senses, locomotion and the voice; and, in the second, those which combine to organic chemifaction, which in their operation are *explorative*, *preparatory* and *immediately nutritive*;—a division and classification of the phenomena of man, he looked upon as being the most natural that could be made.

By Ruiller only three radical properties, *motility*, *impressionability* and *vital affinity*, could be distinguished, as the causes of the functions, which he modified. Barthez saw in the living economy five original forces as appertaining to all living beings, which he regarded as the immediate laws of the vital principle, and which are *sensibility*, a *force* of contraction, of *expansion*, *fixed situation*, and of *tonicity*. Blumenbach likewise admitted five, *sensibility*, *irritability*, *contractility*, a *plastic force* or *force of formation*, and a

special force of life. The functions made by each bear the impress of these first considerations of living phenomena, or properties from which they emanate. In his system, Bichat held the same number of original operative forces, but he altered both their names and the names of the functions. His quadruple form of sensibility and contractility, so well known, so popular, is thought by many to have reduced order out of confusion, and to hold up clearer lights before the investigator of the physiological problems.

But after all his great labours, are we not still annoyed with much darkness? and does not the order of ideas his system unfolds, present *lacunæ* to the mind, which make us suspect it not to be the true copy of nature? Sensibility, for example, is the faculty of the organs through which impressions are made. It is the faculty of impressions. The results of its action in some organs, are *simple movements*, of which the mind is unconscious; in others, the results are *sensations*, movements in which the mind participates. Can we call by the *same name* of *sensibility*, the *cause*, which produces *effects* so opposite, so widely different? and does the distinguishing of sensibility into *organic* and *animal* explain the difference in the results, and vanish the difficulty? But to proceed.

Were the living properties tangible to the mind, authors could not differ so much in their appreciations; but being neatly the most complex, general expressions of vital phenomena, the boundary lines, which separate between where the light and the darkness fall, differences can but exist. The phenomena are more obvious; accordingly good physiologists harmonize more with respect to them; and, however diverge the points from which they set out, or the unknown of these phenomena, their systems, as is manifest from the exhibit just made, quadrate in substance.

By all the functions the *nature vital* competes with the material movements, and progresses in time all lives. Their definition, classification and history are physiology; the description, arrangement of their organs,—anatomy. The anatomy and physiology are never the same, but modify at

each point along the living line. The foetal life of all, and that of the inferior races, are achieved by a less number of efforts, than that of the superior. These diminish in the direct ratio of the growing simplicity of structure; so that each living individual of all the races, as in nature there is nothing uniform, presents a mode of vitality peculiar to itself, varying in intensity or amount, and modifies the general movement of the material forces by a greater or less number of acts.

These forces, or *gravitation*, the *attractions* of particles, the *polar energies* never, as I have so often said, relax activity—worlds constantly dart through space; the particles of all bodies exist in ceaseless effort. All life plays,—moves through time in the torrent of this material action, vehicle of ages. The functions of life are only so many modes of action, action which comes from without, as the sensibility, excitability of physiologists sufficiently testify; life is this *material motion continued, modified* by the special forces, the prerogatives of the opificer of the living body. Life too is ceaseless motion, and to be, is necessarily so, since it demands, as a condition, the response or co-action of its own forces with those of the material activities.

Accordingly, the simpler the structure, the fewer the responding efforts or functions, the more the life resembles the life universal, and the organized body, the body anorganic, as already early noticed in this work. Indeed, this organizing life to us has its limits, beyond which no distinction marks it out in the great animation of nature. Its first essays are scarcely distinguishable; it terminates abruptly in man in the ascending series. In his opposite extremity are placed the *lithophytes*, *zoophytes*: if it descends below, it escapes his resources; above him are the angels, beyond the flight of his zoology. From the *lithophyte* to him extends its long line composed of a definite number of varying forms. On the one side of this line, its forces dispute strength with those of matter on the other, and its fulness, varying at every point, is in proportion, as I have said, to the simplicity or complexity of the organs and functions. Accordingly man,

completeness, fulness of all sublunary organization, enjoying *sensibility*, one of the organ-making forces, in the most eminent degree, offers the greatest resistance,—modifies the most the great action without,—and triumphs most over matter. And if we were to conceive this line extended, or another order of organic existence above him, for which there appears the most ample room, in which the organs would be more multiplied, the sensibility, all the special forces of life, more exalted, the operative energies of matter would be brought still more under the dominion of these forces. If we suppose angels—armed with great strength, their living powers appear to exercise the most complete sovereignty over matter. They pass through space independently of the laws of its motion; they smote the army of Sennacherib on the heights of Jerusalem, struck with blindness some of the people of Sodom, resisted the maddened fires of Nebuchadnezzar's furnace.—

The duration of individual life appears not in the direct ratio of its fulness or perfection. Many of the vegetables outlive by many centuries the longest lived of the animals. Nor does its impetuosity, or the more it modifies the great action without, regulate its length, since man outlives many of the *mammalia*, birds, and fishes. In general, the more slow and equable, the longer it endures. And, since the essence of its progressive motion is alimentation, or the subjugation of the forces of foreign bodies, and spoliation of their forms, were its own energies only expended in such spoliation, for aught we can see, they might admit of repose, and secure greater longevity. But by a law veiled among the secrets of animated existence, these bodies, thus converted and modified, rebel against their modifiers, and require a new series of efforts for their expulsion. They will traverse only the circle of changes demanded by the organs, but no farther. They will not remain permanently nutrified. There seems a natural incompetency on their part or in their modifiers, which causes them simply to organize, but not to remain fixed in the tissues. By this law of nature necessitating perpetual alimentation by disalimenting the sub-

stances which nourish, only a single life made free from death among us, might convert, in sufficient duration, countless millions of times, the entire organizable planet, into its own substance.

I need not repeat here the great inequality of the two classes of forces, of which the motion of life is in the struggle; or that those of time are always equally full, while those of life as equally vacillate—vary from conception to death. But if the forces vary, the organs themselves vary not less. So decisive are these organic changes, that each period of our lives necessitates an anatomy and physiology mostly applicable to itself; and those who write such works, find it convenient to fix dates, to which their descriptions apply. We will terminate this section by some reflections on the different phases of our existence.

If the greatness, excellence, value of a thing consist in its unchangeableness, permanency, how humble, how much like nothing does man appear, as seen in his image reflected by the glass of time! Behold him aged. The weight of a hundred years has bowed him. He is bending slowly to the horizontal position of his approaching rest. His life is flowing back into the great bosom of nature, and she is gently laying him down, that he may not fall. Death has come near him, whitened his hair to ornament the sepulchre; and, with his strength-extracted his juices, that his transition may be smooth and easy. His muscular substance, no longer useful to him, is wasted; and the dry skin pleated, contracts round his bones. His robe of flesh, too heavy, is laid aside, the apparel of other, more vigorous days. He is noiseless and motionless where he sits, in imitation of the silence and rest to which he is tending. His features are cold, and pale; the fire of life is quenching, to harmonize with the winter of the tomb.

Hold him now up before the mirror of time; and he will decompose into several distinct beings. Compare him with himself; he is one with nature, but many with time. He has only preserved his being's model, and lost all its forms except the last. Through how many deep waters of sorrow,

oceans of tears has he come! Since he began, how many funerals he has made, tombs he has filled, in the dark gulf of the years he has withstood! How many dissimilar pieces compose his whole, which resemble him now almost as little as any thing beside! One hundred years since, he was his mother's blue-eyed boy. Place this boy before him, and but for tradition, he never could conceive, it had once been himself—that in it he had begun existence. He exists still, but this boy was a phantom which vanished—long since ceased to be. Subsequently he was a “whining schoolboy;” and afterwards to correspond with the impetuosity of his vigor, the flames of love and ambition were kindled in his heart. These two last nearer to him, are less like him than the first, to which he approaches in his helplessness.

Where are now the different things he has been, and what proportions do they bear to one another, and himself? His whole tangible substance has often been completely changed or renewed; and he has brought with him no part of his original, organic materiality. He is materially a new being, venerable, bowing, tottering to natural nothingness. The different phases of his existence—the different things he has lived—are gone from where they were—fled—shapeless, motionless, nothing. The death before him forms but the shadow to the solemn funerals of himself he has passed through and been compelled to witness. He is simply a variable quantity projected through an arc of time; years have had his mouldings. He is the union of the special forces of life, and those of matter which immerses him, both of which continue, as we have seen, always *in nisu*. To the natural variation of the intensity of the former, are due his different phases, his different, dissimilar selves, and the deaths over which he has stepped. All that unites the different forms his years have moulded, his integral parts, are these special forces transmitted in his original germ by parents.

What is he? materially always becoming new, in his forces growing old. His course through matter, whose energies always remain the same, is boundless, and promises him eternal duration; but his individuality is in his own forces,

which perish. If matter, one parent part, would sustain him forever, he lacks the permanency of power to measure strength with it, and dies. The waters of time, dyeing deep his existence with their many colors, bear him from his mother's womb, wash him up, and leave him on the threshold of another world, with which his *forces renewed*, are ever successfully to compete.

What is he in his thought? The mutations of his intellectual vary and offer as striking contrasts, as those of his organic life. I shall point them out elsewhere. However discrepant, they are but one; although it is not so easy to ascertain what may be the medium of their union. Locke and his *sectateurs* made consciousness this medium or the principle of identity. Whatever it be, it ought to extend to all the phases to make a whole. We see nothing in common between intellectual infancy and intellectual caducity to unite the two. Mind is either one in its own nature, independently of the gradations which the evolution and accidents of organization mark upon it, or in the special forces, with which it enjoys mysterious connections.

The mind makes its explosion with the development of the organs, and suffers change in all their changes. Toward the last term of life, the power of retaining ideas is almost extinguished; it can scarcely connect any two successive moments of existence together; and all that it contained is pretty well blotted out. If night has come over the eyes, it is growing apace in the mind; it is the night of the dead, of which nature gives the foretaste. I will make an important observation.—These our moral phases are to be *reviewed*, and placed to *proper account* in the great life, to which the present one conducts.

SECTION II.

DEATH.

THE Greeks regarded death as a beautiful youth. According to Hesiod, he is the son of Night. Euripides intro-

duced him in his Alcestis covered in a black robe, and armed with cutting steel. Some of the Roman Muses represented him as overshadowing the battle-field, and pointing out his victims with bloody fingers. Horace has spoken some handsome things of him.—In his perpetual journey, he knocks at the cottages of the poor and the palaces of kings. Dante and Shakspeare armed him with terrific powers, and gave him dominions. Milton made him a hideous monster. The Scripture personifications of him are terrible and sublime.

Some philosophers lavish their eulogies upon death, court our approbation, and recommend him to our admiration. With them he comes with his hands full of poppies, and the sweet cup of oblivion for all our sorrows. Universal consolator, he comes kindly at a sacred hour, when we are in the greatest need; the only power, who, by his delicious slumbers, can quiet the pains which have wasted, tormented us for long years; and separate us from our corruption. He visits us only for good;—to shield us, when the tumults of life rise too high, and its storms blow too heavy upon us;—to relieve us, when we have become hideous from the wrinkles and toothlessness of age; loathsome from progressive disease; or our bosoms full of incurable griefs, which time has nourished. But for him, our ills and torments would have no end, and we should be delivered over a perpetual prey to their rage and fury. Thus Seneca energetically—

—*Heu! quàm dulce malum mortalibus additum*
Vitæ durus amor: quum patet malis
Effugium, et miseròs libera mors vocet,
Partus æternâ placidus quiete.

And again—

Optanda mors est, sine metu mortis mori:—

Socrates looked upon death, as a long voyage into a foreign land, where the mind is solaced with novelty and pleasure. And Juvenal has given us his opinion with advice—

Fortem pasce animum, mortis terrore carentem,
Qui spatium vitæ extremum inter munera ponat
Naturæ.—

Other philosophers regard death as cruel, unmerciful, odious, revengeful, insidious, atrocious, implacable, terrible; the constant and greatest enemy of our species. He knocks from the lip the uplifted cup of pleasure; disappoints in the midst of the brightest hopes; makes his approach at the most unwelcome hour; snatches the bride in her loveliness from the embrace of her promised spouse.—*Erepta est, toro intacto, puella innupta*. With his scythe he mows the fairest flowers; cuts the stem; orphans helpless infancy; and stands ever ready to strike.

—*Prima quæ vitam dedit hora carpsit :
Nascentes morimur, finisque ab origine pendet.*

In our bosoms we wear his uncicatrizable wounds. The deep, convulsive sobbings of the heart; the loud, wild cry of grief and despair; silent, tremulous agony; and flowing tears, announce his presence. His language is—

Abstulit atra dies—O flebiles noctes!—amari dies!—

So wept Cardan for his child; Nazianzen, for Pulcheria; Alexander, for Hephæstion; Adrian, for his Antinous; Hercules and Orpheus, for Hylas and Eurydice. On the death of Vespasian and Aug. Cæsar, according to Aurelius Victor and Paterculus, the Romans bewailed, until they feared the ruin of the world.—“*Orbis*,” says the latter, “*ruinam timueramus*.”

Homer defines the sorrow of death, “*a dark rushing cloud*.” We live continually amid his menaces, his terrors, disasters, his desolations and devastations. How beautifully true that:—

*Nascimur in lachrymis, lachrymis quoque vita madescit;
Sed vitam rursus linquimus in lachrymis.*

Drapery mostly of the ebon hues, symbol of darkness and night,* is his outward show; urns, cenotaphia, sepulchres,

* Some one not remembered, has written the history of sepulchres. Had we a well-digested monograph of the various colors, and things used in mourning; the views of nations respecting them, which prescribe the forms of funerals, the manner of sepulture, and the rites of the dead to be observed by the living, it would form a good syllabus of the laws, philosophy, morals, letters, arts, manners, religion, usages of mankind.

sarcophagi, mausolea, the lettered marble, statues, his monuments; his poetry, the elegia, epitaphia; and his local habitation the whole world.

However different the durations they traverse, the forms they occupy, the end of all lives is inevitable, certain. This order of nature, so constantly published, so rigidly enforced, has not met the entire approbation of mortals or the immortals. "Dans sa douleur," says Fenelon, "elle (meaning Calypso) se trouvait malheureuse d'être immortelle." Chiron, the illustrious instructor of Æsculapius, Hercules, Jason and others, lamented his immortality with the deepest sorrow, and most piteously begged death at the hands of the great Thunderer. Like him many of the gods mourned over their doom of perpetual life, and desired only to taste the sweet cup of Erebus. The daughter of Oceanus offered Ulysses the unfading flower of manhood in perpetual life, but he refused.

Few men, however, are contented with final oblivion, with not leaving behind some riflet on the sea of life, to mark where they rose or sunk. Many strive hard by illustrious actions to secure the trump of fame, and eternal remembrance:—some by summoning the wolf and the vulture to the feast of their prey; by the clashing of shields; by the flashing and thunder of living war; by some great and good invention, some noble achievement, illustrious discovery in science. Thus had bronze, and marble, and letters, and things not decayed, the whole earth had been a confused heap of their *memoriabilia*—symbols of the phantoms of *human, mortal* immortality; and living men been deprived of admiring men yet to be. The same darkness, which conceals what has been, is still in futurity to oblivate what will be. Sepulchres have sepulchres in this darkness. The Boëtian and Egyptian Thebes, Carthage, Delos, Babylon, Sparta, Argos, Nineve, Agrigentum, Persepolis, Ilium, Mycenæ, with all their golden palaces, ivory thrones, magnificent tombs, are erased. Cities, countries, sepulchres, whatever holds man, find other sepulchres to hold themselves. Amid this infinite mortality, he cannot be immortal. It

was in the contemplation of such desolation, Servius Sulpitius, in a notable letter to Tully, consoled himself for the oblivion of his own life, and so ought we.

Many of the immortals, as we have seen, most earnestly desired to die, and could not, while men receive death at the hands of nature as their birth-right, their inalienable heritage; and piteously rear up monuments to petition posterity for perpetuity in remembrance. No being, that ever tastes the sweet cup of life, but desires to drink it to the last drop, and that drop forever coming. Chiron desired death only because he could not endure the agonies of the incurable wound he received from the poisoned arrow of Hercules; and the beautiful goddess Calypso, because the pain was insupportable occasioned by the unrequited love and long delay of her lover.

The inevitable accumulation of afflictions, which Herodotus considered as a sufficient apology for the brevity of his history, ought to make us appreciate the kindness of nature, and conciliate us to death. Had she intended us to endure, how could she have formed our substance so lacerating, vulnerating—so destructible? With such contexture of existence, how can we continue in the fluctuations of the universe so great, so violent, sudden? Our world itself only survives its own dissolution in the permanency of the forces which recombine its shattered forms. Our impelling forces once overthrown, never recombine, and continue us. Our bodies once broken, remain dust. Our true immortality refused by nature, is in the *cultivation* of *piety*, which, through "*patience* and *tribulation*," will eternally unite us with the Sovereign Creator.

But it is neither the fable nor the morality of death, I am here to consider; but death a law of nature regulating the affairs of her economy. *Dum fatum fugimus, stulti fatum irruimus*. In perpetuating the shadowy dead, adamant is crumbling, brass, what is most durable, is wasting in the friction of time, while she is making continually fresh deposits in the tomb. Mortals make supplication, and, until the last sigh, grasp eagerly at every forlorn means of life,

fearful to plunge the chilly blackness of the gulf which is forever to hide them. Would she turn to behold them perishing the second time in the ruin of their monuments; hear the piteous supplications they make bewailing the bitter portion she allots them; relent in commiseration; and shut up all the gates of her empire on death, what new phenomena must she soon present?

The great depository of all her living once closed; the epochs of ages arrested in their flight; all the spacious chambers, where she accommodates her lives would soon be crowded to overflowing, from the impetuosity of reproduction. Were it practicable, the entire mass of terrestrial matter in time, would be transferred in the various creatures, to the organic state, necessitating its augmentation. The great balance between the mineral and organic portions being lost, universal anthropophagism would be more horrible and repulsive than death. It would no longer be, simply Pyrrha casting stones behind her; or Chronos devouring his own children soon as they are born, but children and parents, with worse than cannibal ferocity, devouring indiscriminately one another.

Every animated being demands, as an indispensable condition, that a portion of the terrestrial matter remain in the anorganic state while it exists. This matter bears unknown proportions in this respect. A definite creation of matter, therefore, and the creation of a life expanding indefinitely without restraint—an indefinite creation of life—are impracticable, impossible in the existing order of things. Such a life even as ours, infinitely below many others in expanding force, we may conceive, put in operation on a planet no larger than ours, at an epoch not distant, would fill up all its continents; and to continue, demand dimensions in time threatening infinite space. As it increased in size, its reciprocal attractions would be proportionally increased, modifying the length of its days, nights, and seasons. But since the dynamical conditions of our system are absolutely fixed in the quantity of matter each planet contains, a life like this, unchecked by death, would be perfectly *unsolar*; would con-

stantly jostle the great statical balance of the world, and is contradicted in its very constitution. If nature has restricted the motions of all matter to definite quantities, so she has the motions of all lives, generation, the springing fountain, death the restraining force. If her great bodies finishing their weary journeys commence anew, so do all her lives in renascent ages.

Since bodies purely mineral or azotic, being the supporters, are as essential to vitality as those which are organifiable or nutritive, the two classes hold equal rank; the one exciting and sustaining the living actions, the other operating as their immediate seat. Many of our lives, at the rates of fecundity with which they are armed, without death, would work out their own extinction in a given epoch, by consuming the alible matters, or by destroying the alimentario-mineral balance. Death, consequently, primarily necessitated by the laws of motion imposed on matter, by sparing the stores of the immediate organic elements, or by maintaining this balance, is the condition of all vital perpetuity. Lives capable of expanding by generation and contracting by death are alone *physical*, since they all need to be warmed at the great fire of the sun.

Every living body is essentially individual, and enjoys peculiar relations with all others. They are either its stimulators or nutrifiers, or both. How many are the nourishments, are the stimulations of life, and from how many sources do they come? Light stimulates the eye, the blood the heart, an idea, volition.—Suspension of the planets' motion, of the solar effusion, change in the constitution of bodies, would effectually kill as the suspension of the circulation, of respiration, innervation.—Animated bodies are only the more *delicate* and *sensitive parts* of their world, any derangement of which is derangement to them.

The portions of the earth absolutely azotic, probably cooperate with death in limiting the number of all species. What proportion of the organic elements lives at any one time cannot be determined, but we may think, nature continually lavishes life fully up to the means she has at command, or to the amount of these elements returned from the organic

state. And, from the rapidity with which death at certain epochs seems to traverse the whole earth, it is probable, the matter returning from organization is occasionally too much consumed, or life is put a little in the advance of its means.

Matter is a fixed, life, a variable quantity. Death adjusts the latter to the supporters, and regulates the amount through time. Epidemics, as some writer has remarked, appear to act as safety valves, letting off its occasional excessive accumulations, and keeping the great ship steady, which bears all the living across the sea of time.

CAUSES OF DEATH.

We are in absolute ignorance of the causes which first made us live; we know not those which fix the limits to our duration. Since the origin of our species, history presents these limits as having greatly varied. Human life on this side the flood compared with that on the other, presents the most frightful chasm. How drowsy, tortoise-footed the motion of the one! the other is quick and rapid as “a weaver’s shuttle.”

Early after the destruction by water, all the historical monuments show the mean duration modified a little by locality, has remained the same. It is true, however, those who kneel at the feet of the Muses for inspiration, often bestow on the great men, for whose achievements they tune the lyre, a strength* and sometimes an age, which far transcend those of common mortals. But their testimony is not convincing, since they are only responsible for the truth of fiction, and not of history.

Some speculative philosophers offer as a satisfactory solution of antediluvian longevity, the extreme clearness, deep cerulean color,—healthy beauty—of the primeval sky; the superior purity and salubrity of the first climates; the stable temperature of the seasons before the age of Boreas, which knew no storms or frost; the pre-eminent nourishing powers of the alible matters; the great gaiety, joyfulness of early

* Vid. *Æniad*, vi. Virgil.

people.—The dissolution of the earth in the diluvian waters; universal disintegration of its whole face; destruction of its first order; its general deterioration according to them, have poisoned life in its sources; and located death near its threshold.

Contrarily, whatever influences such geologic changes might exert, we should believe our days have been preternaturally shortened, and secondary causes instituted to sustain them in the new limits. From what has already been advanced in this chapter, it is manifest, so far as our world is concerned, it would support us forever, its forces never varying in relation to life; and, that since we live in its reaction, we die from the overthrow and failure of our own forces to sustain us. Nature knows but one manner of life. The conditions of antediluvian vitality were precisely the same as at present. Men lived by constant alimentation and stimulation; by the simultaneous organization and disorganization of the surrounding bodies. Although the changes the earth underwent may have been great and numerous, from the sudden explosion, and increased activity of the molecular attractions during the deluge, yet if it be capable far as concerned, as it most undoubtedly is, of continual support, and would constitute us immortal, did it circumscribe all our conditions, it is most unphilosophical to attribute the shortening of life to pure physical agency or diluvian action. The causes must be moral; the limits affixed, of Divine appointment, yet achieved by natural means.

The forces, which would rear us up from fragile infancy, and establish the flower and vigor of manhood, it would appear reasonable, ought to continue us. But this progressive perfection, contrarily to all reason, stops suddenly; and the same forces hitherto so successful, allow our organs to deteriorate. Propelling us up the Orient of our days, they augment in intensity to the summit, maintaining in the evolution and change of our tissues harmony in the form, substance and use. Afterwards they begin to change in their chemifying tendencies, and alter the modes of productive activity. Their morphology is no longer the same

"All living bodies," Beclard remarks so justly, "commence in the soft or fluid state, and continue to grow harder and harder till death." Ossification hitherto confined to the bony system, seizes on, and attacks the soft parts, deprive them of their elasticity and other qualities essential to their operative functions. Parts ramollesce, atrophy, induresce, hypertrophy,—make perpetual deviations from the primitive types of structure. The general hardening of the organs grows apace. Dysnomia, misrule reigns in the republic of the living body; augments more and more, until its elements are transferred to the action of affinities purely chemical, the action of the sepulchre. Sad decline, alteration in the laws of vital morphogeny, which places the sepulchre among the wants of our nature!

The scales in which our forces are weighed, lose their natural balance; and open a thousand gates to as many forms of death. How nature has planned, toiled to make sure of our extinction! In our career, if we run by some of the bye-path of death, we cannot escape, are sure to fall at others. How prodigious, multiform is our mortality! Man, creatures descended from an Eternal Being, seem hard to kill; and has demanded at nature's hands the enactment of a code of innumerable laws. In a single law she holds the rein of universal, material activity; by a single effort she moves the whole frame of matter through space; but how many efforts does it demand of her to arrest, and suspend the vital motion! Death is an *eulogium* on *creative* power!

So energetic are these laws of extinction planted along life's pathway, that few, very few of all the living escape to fall by the last of the series; or run through all the possible deteriorations of their organs, and expire in senile death. Around the great axis of vitality, about which the animated races are rotated; as individuals, they describe every possible section or segment of the circle; while, as just noticed, it is the lot of very few to traverse all the phases of mortality. These phases from their number, contrast, I may observe, most strikingly with the singleness of the ultramaterial career, described in the physiology of our sacred books.

From the embryo to the term of perfect development, the formative forces, undisturbed by disease, are regular and uniform in their operations, maintaining the proper order of structure and functions. Each organ lives freely in itself, and in the whole. The action, it reflects, and those it receives reflected, comport with well being. All the functions are full; and, in the *vertebrata*, the tripedal life, energetic. But beyond this term, the guardian power, which presides over the organism, begins to abandon it to progressive ruin and desolation. The space, which the pure and the perfect action of life circumscribes, is that which nature seems alone solicitous to secure; and is that, which encompasses reproduction. All beyond is sheer gratuity, the pathway, which slopes gently down from the beating pulse. Reproduction is a great end in all lives.

All beings continue by the equilibrium of force. Senile death is the subversion of this equilibrium secured by organic deterioration. Animals perish through excess of ossification, progressive hardening of their soft tissues. We see nothing like this in chemical morphology. The plastic forces of matter never change the mode of their productive activity from dysnomy. Did we witness one form of matter invading another,—whole islands the soil of the fertile valley, tending to lapidification, as we do the soft animal parts, to abnormal ossification, et cet., we might suspect changes in the economy of matter had operated in shortening cidiluvian life; and material causes are still active in achieving natural death. Consequently, the causes of such death attach alone to the nature or conditions of vitality. The mechanism of all mortality from age, is the depravation of nutrition or spurious chemifactions of the organs. This depravation or cause is an ultimate irreducible fact. The deviation from the normal structure progresses, until the organs become unfit for the display of their functions; the forces weaken, exhaust, and they suspend forever. Could living bodies sustain steadily the molecular formative action of their organs, they would be immortal. But they cannot sustain it; it will pass through the appointed changes; they must reach the dust of the tomb.

Generations are born hungry; this dust is their food; these changes are nature's preparations for their festival hour.

May I remark here;—men have dreamed, they would live their lives over again in nature; would revisit the light of the same sun, they left burning on closing their eyes on their departure.* The great returning year of Pythagoras, of many of the ancient sects, which brings up into existence again all who had perished by death; all that had wasted in time, but flattered the hopes, the vanities, the ambitions of mortals. Since then the light has struck deeper into the labyrinth of the world. A great revolution impends; the great year will truly come; the long silence will break, but nature will wear a new face.

SECTION III.

PERPETUATION BY GENERATION.

LIFE has been assimilated to an isthmus, a narrow strip of land; on either side roll the two great oceans of eternity.

* Our Franklin, always thoughtful, ingenious, on beholding some flies brought across the sea in a cask of wine, revive when exposed to the sun, conceived it possible, their example might be imitated by a human being. He evinced resignation to be housed a few hundred years in a cask of Madeira, could he be sure of solar revivescence, and of revisiting his dear country. But could he have compared the scanty conditions of insect life with the great, voluminous life of his own species, he had not thought so easily to have broken the bar of human death, and effected resurrection. Could he have seen living nature with the great modern eyes of MM. Cuvier, Geoffroy—Saint-Hilaire, Serres, he had felt all the emptiness of such a conception. It was his glory to have shown the gleaming lightning its path, but not mortals the way through the grave to life.

The desire and hope of returning back to the world were born with the human heart. The practice of embalming among the ancient Egyptians, and nations of the east, ascends beyond all history. By this kind of preservation, they expected to keep their dead bodies for the great returning year of life, when the soul would again have use for them. They looked for the perpetuity of life in the same tangible forms. How tender the love, which preserved them? A distant descendant could behold his fathers through series of generations back in the same sarcophagus. And how early the light of the Bible fell on distant nations, giving form to their fables?

By constant generation all animated beings emerge from the one; by death replunge the other. If death kills, generation makes alive. The two forces counteract each other, librate in the great scale of time.

Generation! great law of creation, inexhaustible reservoir! which holds all the subtle fire of animation, and pours over the face of nature the floods of life contemporaneously with those of time—Reservoir! whose springing fountain is the Divinity; and whose equable fulness blots from the face of things the inequalities, chasms occasioned by death. In *Deo vivimus, movemus, movemur et summus*. It is not only true now in *Deo vivimus*, but it will still be true through all incomputable duration. We shall never get rid of the cause which first made us live, and continue in ourselves. Yet, with passion the transcendental philosophers materialize all phenomena; and present nature in dress and energy purely corporeal. They locate the fountain of life far as possible from the active sphere of the Divinity. Generation with them is simply the conflict of some subtle matters of opposite tendencies. But what is the charm of felicity—in what consists the supreme beauty and good of pure materiality? Can a life, which flows from one of the great animating forces of the universe, accord better with reason, be more excellent, than one, which breaks fresh from the foot of the Creator's throne, of which this force is the *simple* vehicle; brings with it its own transcendent energy; and diffuses itself through myriads of admirable and excellent forms? And is a world under the control of Divine prescience and benevolence, less estimable, than one under the undisturbed autocracy of matter? The eye of God too watchful, too close, frets and annoys the course of moral events. O fatum illucabile generis humani!

All that live derive their existence from beings similar to themselves. Generation is the transmission of the *nature* essentially *vital* or *organific* to a separate portion of the maternal organization dedicated by nature, which causes it to attract upon itself or absorb bodies in contact or transmitted to it, and convert them into its own proper substance.

By this transmission it ceases to continue a living portion of the mother as it had been, lives in itself, and becomes a new individual resembling its parents.

The manner or mechanism of this function dualistic in all the more perfect races, is modified throughout the living series. The production of the first animated forms is clothed in the mystery of creation; their origin since inexplicable has continued to vex philosophy. No topic has ever been more fecund in research and speculation. Malpighi, Haller, De Graaf, Spallanzani, Valisnieri,—with ardent impetuosity, and great compass of thought, entered the wide field of experimentation.* They pushed forward their utmost glances, reasoned up what they could see, but were everywhere met with *Procul, O! Procul este profani!* Buffon, gaudy with the shining form of thought, approached confidently nature's vital elaboratory. But his *molecules organiques*, and internal nutritive moulds for the use of the formative power, are now things for the ivy and the dust. If nature, in our sensitive race, has thrown the veil of modesty over the exercise of this function, she has not been less careful to keep her own secret.

It is ours to contemplate this function as one of the great

* Dr. Franklin, as put down in his published works, holding the existence of two seminal fluids as believed in his day, conceived the phenomena of procreation depended upon the intimate union of these fluids; and that a human being might be mechanically reproduced. With this view, in a vessel containing water of the living temperature, he mixed the two fluids with the expectation of a fœtus. No doubt he was imitating Spallanzani, who was filling the world with frogs by the application of some diluted mineral acid to the spawn of that animal. This experiment of the Doctor's is a laughable reproach to his genius. But great men, some one has said, have great follies. Not only he, but others were misled by this specious hypothesis. Buffon mentions, in his *Nat. Hist.** as triumphant proof of its truth, a man who was actually impregnated by a woman, and brought forth. Richerand, Gerdy, mention cases which must be similar, the mechanism of which is now well known. A very extraordinary one occurred quite recently in the district where the author resides.

* Wood's translation.

repairing forces of the living economy. Adelon,* Cuvier,† Tiedemann;‡ the writers generally on natural history, have developed *in extenso*, all its modifications with those of its apparatus throughout the zoological series, to whom I refer for the details.

Since the scythe of death sweeps over the whole field allotted to life, it is manifest, but for the continued, energetic activity of this great repairing force, soon the whole earth would be one tomb, and the career of ages for ever suspended. On the one side its action is limited by ovarian embryogeny or germification; on the other, by the disposable amount of the alible matters. Since there is always excessive plethora in renascent life, the embryogenous limit seems to hang in progressive time, with infinitely less heavy weight, than that of the *pabulum*. It is obvious the natural rates, impetuosity of generation, is in prodigiously great disproportion to the means of vital evolution. So great is this disproportion, we may conceive, were our world made simply the theatre of this function, and were others to furnish the means of maintenance, it is not impossible in definite time, the rapidity of these rates, despite of actual mortality, would be sufficient to people with our lives myriads of such planets as ours.

So far as the distinction of sexes exist or can be traced down the living chain in the animal kingdom, nature, with some exceptions, seems to hold in excess the means of female fecundation. Although the sexes are procreated not far from equal in numbers, the fecundating power of the male, in most all the species, appears to be calculated far above the number of the ova or possible progeny of its female. So that a solitary male is competent to sustain *le plaisir délicieux* of a number of females, and to stimulate to all their offspring. Besides, what flings the balance of this mysterious power much more on the side of the males is, that the season of love

* Physiologie de l' homme before cited. The account succinctly but handsomely drawn up.

† Anatomie comparée.

‡ Traité complet de physiologie de l' homme.

returns to the greatest number, when a solitary union may be sufficient, and in many families, suffice for a numerous progeny. Much time too is consumed in incubation, gestation, maternal cares, while the force which fecundates continues energetic, restless.

In meridional countries, and those whose climates are warm, where religion is in favor or does not forbid, this balance of reproductive power possessed by the males, tends to polygamy common to the majority of the animal races, and finds its equilibrium. We know the personification of love, the Cyprian Beauty was born of the *fluctuating, unsteady* waves of the sea. Friedlander* estimates the number of children, which may be born to the polygam, to be 925, while the greatest product of a single marriage, is only 32. As 925, therefore, is to 32, so is the probable male to the female fecundity of our species. In some of the lower orders, we know this difference is prodigiously greater, but cannot tell what it may be in all. Besides some are naturally monogamous.

Human polyandrisim exists limitedly in the hyperborean regions, occasioned there, according to M. Virey, by the superior number of male over female births. The female bee lives in her seraglio surrounded by the males; and like her the vegetable tribes are very generally polyandrous. But these exceptions cannot compensate for the general inferiority of female fecundity, so that the limit of the feebler sex in this respect is one of the true boundaries to the possible amount of terrestrial animation. It is almost certain, however, the great life of all the species is never affected by such a restraining force, since, when we compare the provisional beginnings of vitality in creatures with the means of sustentation—vital maturation or the *nutrienda* with the *nutrientia*, the disproportion between the actual rates of generation and death, and these means of support, is most obvious and striking. In a carp of a half pound, Bloch counted 100,000 ova; P. Petit calculated 262,284 in another only 14 inches in length; and Leuenhœck found no less than 9,344,000 in a

* Dic. des Sciences Med. art. Population.

single codfish. Whatever faith we may have in these numbers, the fruitfulness of nature is truly marvellous. A few of such lives sustained, might people all her starry spheres.

Accordingly, it is not the general inferiority of female fecundity, but the paucity of food, which constitutes the true operative barrier to the great expanding life of the world. Food, precious substance! into the presence of which nature makes every effort to bring her nascent lives. The seeds of plants, ova of insects, fishes disperse on the winds and waves. Seas, tempests, volcanos,—are her ministers to bring her children when born to her festival board. She always keeps the flames of life burning, I repeat, fully up to the means she has at command.

Upon this disproportion of food, we may conceive, the great life on the earth's surface, in the revolutions of time, must occasionally contract or expand as the alible matters are more or less favourably situated for active alimentation; and, that, the same localities in different eras, must vary greatly in the sort, intensity and amount of vitality they nourish. Man, arbiter of his own fortune, holds greatly under his control the means of creating subsistence, and multiplying his numbers. He is active in this respect, pretty much in proportion to the varying amount of knowledge he may possess. Our great continent expanding from the isthmus of Darien to the polar circles, enjoying all the richness of the sun, accordingly nourished but comparatively a very scanty population of the aboriginal people. Depending chiefly upon the parsimonious gifts of Diana for subsistence, they wandered over its fertile soil covered with luxuriant, ever waving verdure and blooming flowers, but the light of letters never came to show them the resources of aliment they neglected, and speed the multiplication of their numbers. This light, mother of the industrious arts, came with the people who are their successors to the soil, whose actual population, through the development of these resources, is advancing with a rapidity unknown to all former statistic history. Egypt, Persia, Italy, Phœnicia, Greece, Palestine,—countries once overladen with our

race, may be said now to be thinly peopled. Their numbers bear no proportion to the flourishing days of their ancient governments; while, since the transfer of knowledge to the West, many of the states of Europe have more than doubled their population.

Letters offer themselves as an energetic, revolutionary power to the multiplication of our species; and in countries where their light is kindling or extinguishing, the number must vary accordingly. While it is the sinking or upheaving of soils covered by water, droughts, volcanic and deltaic action, diluviations of sterile sand,—which offer change in respect to food to the numbers of the lower animal and vegetable species.

Nature has no fresh aliments with which she relumes the life of different ages. Food is a fixed quantity, with which she contrives to supply all by pushing it continually round the great circle of animation. Thus, from the humble plant which drinks the nourishing juices of the soil, she impels it upward to the other extremity of the living scale in an eternal circle of action.

To achieve this rotation, plants are armed against the soil; and animals come forth in the panoply of Mars, ready for natural warfare, predation and carnage. Their appetites are already arranged to urge them on their destiny.

We may suppose the great chief of one of our western Indian tribes had beheld and admired this order of nature so obvious, and claimed for himself the honor. In his war speech he said, "I am of no ordinary parentage. The oak is my mother, the thunderbolt, my father. When he came near her, he leaped from his black couch and broke her in pieces, when I came forth an armed warrior as you behold me."

When we consider the rapidity of vegetable assimilation; the promptness with which vegetables are converted into the substance of the animal tissues; the facility of the further conversion into those of all the carnivorous tribes; the general shortness of all lives; the very few that reach natural death to again become food, we can form some conception

of the velocity with which the organic elements are hurried round the living circle. And when we think how fecund is death ; how inevitable is the destruction and consumption of all lives—that in the great living edifice, each organic form maintains its place only by destroying those beneath on which it rests—that this edifice is composed of perhaps more than fifteen millions of these forms, all continually displaced by death,—we can appreciate, to some extent, the prodigious force of generation, which of itself replaces them all ; and maintains the building in its original symmetry and beauty through the devastating flight of all time.

CHAPTER VI.

GEOGRAPHICAL LIFE OR LIFE IN RELATION TO HABITATION.

HEAT and light are indispensable to the being of all lives. The spherical figure of the sun and earth, the earth's atmospheric envelope, and dip of the Southern pole, make impossible their equal distribution over all her surface at the same time. From this arrangement nothing can be more unequal than the cotemporaneous partition of these imponderables so precious. There are the Tropics, the Isothermal Lines, and the Polar Circles. Some regions are clothed with eternal verdure, blissful seats of the golden age, of the reign of Saturn and Ceres ; some, with eternal snow. Here the earth is an ignited furnace ; and the thirsty simoon screams for slaking blood ; there Zephyrus nourished in the lap of Ausonia fans the cerulean sky ; yonder the fierce blast sweeps the glacial plane, and howls among the everlasting icicles. Here the ravished earth drinks at the sweet fountain of the sun ; yonder the indignant snow repels his returning beams, and maintains perpetual winter.

Thus by connecting heat and light with the dependencies of life, it would appear to us blind, that nature had thrown

up insurmountable obstacles to the establishment of her living empire. She has not formed a separate sun to warm each climate, and yet she has contrived to people the many chambered earth, and give to the foot of generations an equable tread. How has she triumphed over these obstacles, which appear to have arisen from the rigid laws of formation she had imposed upon herself, and which we may be permitted to think, from this rigidity, were unavoidable? For, had the sun or earth been square or any other than the existing forms, in the actual constitution of the dynamical forces, the earth, in traversing her orbit round him, could not have maintained her present type of movement, most conformable, as may be considered, to the system of animation. When she came near the solar angles, if we suppose any other figure, she would have darted toward him, because, in these angles, gravitation would have been more intense; and vibrated back in passing through the segments of her orbit corresponding to the straight lines, giving to her an elliptico-serpentine motion. The figures of the celestial bodies are elements in their motions; they are equally elements in the motion of all lives, in respect to which, we see, they offer hindrances.

But how have these hindrances been removed, and the needed, perpetual warmth compensated, supplied to living creatures? The compensation, manifestly, has been wholly made on their part, by the supply of an especial heat-making function, *calorification*. This function mainly furnishes in all climates the necessary warmth, which mechanical matter refuses, making life possible and practicable, nay, existent over the earth's whole vari-tempered surface. In the warm-blooded of the arctic regions, it kindles a fire compared to the ambient, polar ice, more intense than the incandescence of the glowing forge compared to the heat of our temperate climates. How wonderful is this function! which carries heat where heat but sparingly ever comes from any other quarter; where, in the distance, the affrighted volcano roars and belches forth his coward fires; and where the frozen light* of fabled Boreas waves its streamy mantle, and flashes

* Mr. Hood and Dr. Richardson noticed, that while the Aurora Borealis.

through the icicle-hair of this empire-sovereign of eternal frost.

Since the end of all functions is to organize, or produce some change in surrounding bodies foreign to their chemical affinities demanded by the conditions of life, had the several parts of the earth's surface been exactly and permanently accommodated to the temperature of the creatures which were to inhabit them, I cannot see but this function had been a superfluity. We have no evidence that heat organizes, or undergoes any change in its constitution by the action of the vital forces. It passes within and out of the tissues the same in quality. It appears, therefore, originally created exactly accommodated to their modes of existence; is *essentially nutrified*, or, to borrow the expression of the electricians, is *organic per se*; and is, perhaps, the only substance in nature which is so. Although, therefore, heat exists universally in relation to living bodies in the nutrified or organic state; yet it is not diffused in proportions suited to their various conditions. They consequently require a function, in the same sense they do any other, to elaborate it from surrounding bodies and concentrate it in themselves proportional to their wants.

The experiments of physiologists, of Crawford especially, show that the production of animal heat is due to the vital laws. Living *calorification* comprehends every thing included under the idea of function. It must be a function, although refused to living bodies by so many good physiologists. The dispute can but be verbal. What is called the maintenance of temperature, for which the wisdom of nature has been so much applauded, includes operations both vital and chemical. The experiment of Sir W. Blagden and Fordyce, entering and remaining in a heated oven, only shows that great heats will produce great perspirations. The cooling by the latter has been well understood since Dr. Black, who showed, that caloric is rapidly consumed in

affected, to some extent, the magnetic needle, its influence on the thermometer was next to nothing. Franklin's Nar. of a Journey to the Shores of the Polar Sea.

evaporation by entering into the latent state. But the power of living bodies to destroy the equilibrium of heat in the media where they exist, or of creating temperature for themselves, is purely vital.

The sun is the great calorific functionary of the world. The nutritive parenchyma of vital bodies, the instrument of the function of temperature, is, therefore, his complement, or the *fulness* of solar pyrogeny. Thus the genial warmth which the forms of matter and the determinate conditions of motion, to which they are subjected, refuse, is supplied by a special function; by which every living being becomes a calorific focus, and the glacial with the temperate zones, are mainly rendered inhabitable.

In securing habitation for the polar tribes, ancillary to this function, nature invokes the chemical agency of the bad conductors of heat and colors for clothing. These simply economize the living warmth, and show that such creatures live little by the heat of the sun. Philosophers, however, are wont to admire the white, living robes of these regions, as the *harmonies* of nature. They are rather her indispensable utilities; and show that the Maker of the world was the Maker of animals, and knew how to make its philosophy, resources available in their constitutions. But our thought is too poor to trace or admire the Divine ingenuity.

In like manner, we may suppose, had the polity of material nature refused an equal distribution of atmospheric air over the whole earth, as it has done for the solar effusion, we would have found a complementary provision in the respiratory organs of all lives to meet the exigence;—and under such circumstance, there would have been new organic modifications in this respect.

If calorification produces a change in the state, in which heat naturally exists, the tendency of all the functions is to effect similar but infinitely greater changes in the states of external matter, except that of generation, which is public, and more properly belongs to the species. The causes, therefore, which distribute lives over continents, seas and air, or causes of local inhabitation, are primarily to be sought

for in the general and special conditions, and affections of the matter of the planet. Philosophers look upon living bodies as centres of attraction, foci which continually absorb and expel the surrounding bodies. This circle of action comprehends all life, all functions. The bodies which are absorbed, are animated with forces which constitute all they are in their forms and properties. They tend to persevere in the states, in which their native forces dispose them. They resist this organic absorption. But the functions are animated with a superior force of attraction, which subdues this resistance, and modifies their forms and properties—achieves their living state.

These bodies cannot approach the living forms for their absorption, or pulverize, dissolve to accommodate their mode of chemification. Where the approach and the hardness overcome are needed, they are secured by the bestowment of special functions, locomotion, mastication, with the appropriate apparatuses. Thus the situation of the food, and its hardness or softness, give of themselves several conformations to the responding organs, and modify much the external contours of creatures. As in the waders, *Grallæ*, where the organs of approach, I may say, are double, the aliment being under water is secured both by the length of the legs and neck; in the rhinoceros especially, much of his structure looks to the situation of his food, et cet.—Thus we see the living forms are not original or arbitrary, but like the functions, arise necessarily or have their reason in the general and special conditions and affections of the planetary matter; and the functions themselves are to effect, create what this matter in itself falls short of actual animation. Nature, I may say, has made room in this matter for the living economy; and constituted it the varied means of support. If, therefore, the means, manner of approach, the surrounding circumstances vary, the organs and functions of the creature to which it is the means, will vary accordingly. And, if the means or the supporters are modified in the extreme, so are the living contours. The organs with their functions meet and accommodate the exigences, which the supporters offer,

as was manifest in the history of vital calorification. If the food be solid, there will be maxillary bones with teeth firmly set, and strong masseter muscles to break it in pieces. If it be on inaccessible heights, in addition there will be an especial organization fitted for climbing; if in the water, air; for swimming, flying. If the food be swift-footed, the animal to which it is the food, will have address or be swift in flight to seize its prey. All inhabitableness, consequently, is the resources of lives or their organic accommodation to the external supporters.

Not only are the peripheric organs formed in adaptation to the conditions, habitudes of external bodies, which constitute a place alone proper for inhabitation, but likewise the organs of their interior make. "La complication de l'appareil digestif," observes Tiedemann, "est en rapport intime avec la nature des alimens eux-mêmes dont l'instinct pousse les animaux à se nourrir." The nutritive organs, modified in the races according to the intensity of vital activity, respond to the alible matters; or their surfaces, as Broussais properly denominates them, are "surfaces of relation." They are strictly and directly so. All the parts of animals, except the generative, appear formed more or less directly or indirectly for food, protection, defence—for carrying on intercourse with what is exterior to themselves. The faces of their structures very generally look outwardly. If the surfaces of the digestive system are in relation to external food, the bones, muscles and nerves, which are to conduct the creature to the table where nature has prepared his repast, are not less so. The immediate instrument with which he prehends it, must also be in harmony. The food of the colossal elephant, for example, is on the ground; his neck is too short, but he has a proboscis which will reach it. Many of the other phytivora have necks sufficiently long for prehension suspended by a special instrument or the *ligamentum nuchæ*. The different ways in which the bones are articulated; the different positions and modifications of the muscles, nerves; the presence, absence, or peculiarity of particular structures—in a word—all organic diversity, in the living

forms—must originate in the peculiarity, diversity of external conservation. The forms of matter were first in the order of time, are original; and their variety and permanency may be regarded, in some sort, as the principal basis of the diversity and perpetuity of the living races.

The different sorts of sense, perception, intelligence, hereafter to be noticed, are arranged to the same end as the material organization. The goat must have a nice sense of locality, to walk on the border of the precipice; the eagle, a geometrizing eye, to snatch unhurt the dove from the sharp edge of the rock. The senses must protect from hurtful contact, discover and distinguish the food—

Dente lupus, cornu taurus petit; unde nisi,
Monstratum.

It was this invariable conformity of the living structures with what surrounds—this morphologic harmony of the animate with the inanimate world—which enabled the sagacious Cuvier the first, as I have said, from the inspection of a single bone to detect the race to which the creature belonged, decide upon its instincts, its food, mode and habits of life, and place of local habitation. Each separate part of any animal is the compendium of the whole—is the thread which conducts through the Dædalian labyrinth of animality. The form of the bone, the manner, circumstances of its articulation, will indicate the form of the teeth, and the other structures with which it had been connected; and *vice versa*.

If, therefore, it be dug from the travertin of Ischia, the Phlegræan Fields, the oolite formation, or the clays of the London or Paris basin, it will be an element from which scientific anatomy may remodel the complete organization as it existed in its own epoch.

Accordingly, inhabitation can neither be arbitrary nor accidental, but like the different composing structures, is peculiar, and forms a sort of ingredient in all lives. Nature, as I may say, has finished the earth upon a vast, most magnificent model. She has upheaved some portions of its surface to the regions of cold, where the eternal snow glitters under the vertical sun; others she has depressed as far be-

neath to form basins to lodge her sea-waters; the continents are arranged cutting the polar axis at obtuse angles; and the whole enveloped in a light ocean of air. In this arrangement, without any addition of material, she has contrived to augment prodigiously the geometrical surface. Her pleasure is in life; she delights manifestly in its abundance; has peopled the whole. Yet but one sort of animation can subsist in one sort of place. She triumphs over the difficulty in unfolding a chain of living beings. She adds link to link; modifies organization and its properties until the world with its many phases can respond and administer to appropriate life—until all from the depths of the watery to the top of the great aerial sea become

*Intus aquæ dulces, vivoque sedilia saxo;
Nympharum domus:—deserta ferarumqu'
Sedes hominum jucundæ.*

In fitting up habitation, nature's reliance, as we have seen, is in the power and virtue of organization. If heat exists essentially in the vital or organic state, the other alible matters are not so. If she originates a function to regulate the quantities of the one, which needs no assimilation, she brings forward an array of functions to spoil the forms of the other, clothe them with new properties, quality—subject them to organification—against which the original or native forces rebel. So that in all her habitable regions, the sheer earth, there is nothing but needs alteration, preparation, that there may be life. The power, virtue of functions, organization, are necessarily her reliance, to furnish which with aids, she appears to have exerted all her force and skill.

These aids are very principally secured in the arrangement of continents and seas; and, in the resources of the pneumatic and hydrostatical laws. The sea-water in the thermal zones becoming warm and lighter, is constantly displaced by the cold and heavier waters of the polar seas. The warm water passes to the frozen regions, animating and maintaining life there, which seldom feels original heat from the sun. By this law the icy waters from the two polar circles constantly flow toward the equator, and force the

warm water toward the poles, forming in all seas great currents, as the Gulf Stream, Mosambique Channel, &c. By this constant shifting, circulation of the Oceanic waters, the solar warmth is carried to those regions, which without could never be the habitations of life.

The hydrographical distribution exactly favors this circulation. The two polar seas are connected by the Oceans, which run obliquely across to separate the continents, affording free access to the equatorial districts. The continents cut the polar axis, as above, at very obtuse angles from S. West to N. East, which again favors this circular movement. This direction of the coast lines obviously turns the momentum of the waters, occasioned by the earth's diurnal rotation, to the advantage of such motion.

In the same manner, by a law similar in its operation, the heated air of the Tropics is made to distribute warmth through the colder regions of the earth. It is probable, too, the friction of water in the sea-basins, and of winds over continents, excite caloric, the electric, galvanic imponderable, which help out the heat-making function; and thus, in the hands of all-provident nature, administer to habitation and life, where cold is the opposing obstacle.

Solar heat, inestimable nature! appears to be used sparingly, economized in all the operations of our sublunary economy. There is but one exception remembered.—The ice and snow on mountains and Arctic lands, reflect, and waste it. The balance of the sun's rays, which fall on all other surfaces, is treasured up to be wafted and distributed by winds and waves to those spots, where he himself cannot send them—where the seats of life cheerless, would be more cheerless without them. So closely are all living functions connected in dependence with heat, that all the resources of the latter appear to be rallied, as we see, in supporting hyperborean life, which is still very scant compared with that of the thermal zones. The rigidity of this connection is so great, persevering, that naturalists have been led to consider certain races as made especially for and constitutionally

adapted to certain climates or ranges of temperature, out of which they cannot live or reach natural perfection.

Sir H. Home carried his notions of climatology so far as to conceive, at the defeat and confusion of Babel, the human constitution, since all men at first were of one flesh, was so thoroughly changed and remodeled in order to accommodate the different climates, that, if originally they had been created distinct species, they could not resemble one another less.* They were virtually made according to him distinct species by this change. His respect for the authority of the most ancient and sacred writings, induced him to adopt this view of the subject in preference to that, to which his observations and reasonings conducted him—the different creations of men.

Plants and animals are found, and will flourish only in certain latitudes. This fact is sufficient evidence of original or factitious formation in relation to temperature or climate. It is not less true, that they will only live, and enjoy the vigor of their faculties on certain kinds of food. They were formed in relation to food, toward which the faces, as we have noticed, of so many of their organs look; and likewise to shelter, defence—local habitation—and to one another, which take up and employ the balance of their individual structures. They demand precise, definite conditions in nature, for the *eclosion* and enjoyment of their being. If all their organs and functions are special, this speciality is not single; it looks to a speciality in what surrounds. So true is this, that the organic and inorganic forms of nature exist in indissoluble union in our minds. Could the voyager of our star penetrate the *alentours* of another sphere, and were he to behold there but a *fin*, a *feather*, he would conclude upon the existence of waves and winds there.

The varied organizations of the living chain can but be so many schedules of the laws, the hidden nature of matter; and, could they be deciphered, the true interpreters of its qualities and properties. They are nature's hieroglyphical hand-writing concerning it. Could the world it forms in

* Sketches of the History of Man.

space disappear, and be forgotten, and living nature remain alone, this nature investigated with the induction of Harvey on the way to the knowledge of the circulation, would conduct to the discovery, that, at some passed epoch, such a world had really existed. The eye with all its structures would still look toward the hollow vacuum the sun had left; the feet would point to coaptating surfaces; the pulmonary air-cells, form and mechanism of the chest, and of the ear, to an external tenuous fluid; the teeth, like the x of algebra, to unknown solidity; the skin, with its papillæ, to external contact and sensation; the valves of the ascending venous trunks, would be enduring monuments of the passed existence of gravitation:—Each living structure would be a tombstone to furnish some recollection to perpetuate the perished forms of matter; and, as often as they are repeated along the living series, they would afford fresh, accumulating evidence, that such forms, and such a world had once existed.

In contemplating life in relation to circumscribed abodes, or nature distributing out her territories to her children, a subject so fecund in reflection, we see, that facts are everywhere united with facts, reason with reason, truth with truth, presenting science the prospect of an endless flight. What can we conclude, but that all once existed in the solitude of the Sovereign Reason; was one there, came forth and exists one; and that the universe, many to us, is but the same vari-colored robe which obscures His insufferable brightness, amid which we ever desire to plunge?

CHAPTER VII.

LIVING MECHANICS.

IN the preceding chapter, I noticed the analogy between the special structures that compose the organic system of any life, and the external forms of matter, as the condition of inhabitation. So strikingly and obviously do these forms impress, mark the animated series, that characteristics derived from them, as well as structural peculiarity itself, constitute the basis of zoological nomenclature and classification. Animals are terrestrial, paludal, fluviatric, aquatic, amphibious—the same may be said of plants.

We saw that any distinct organ in any living form, accommodated directly or remotely in its function, some property, condition of the external world. What are we to conclude, organization being the only mode of vital manifestation, but that the direction, laws of organic attraction, like those of the stellary and molecular forces, must have been originally impressed by the Supreme Reason, and that by virtue of such impression, the functions thus respond to the external supporters, and thereby become useful in their own economy? And if we behold some of the living parts, as the spleen of the mammalia, of which we cannot appreciate the utility, it is simply proof, some portions of the path of knowledge remain to be explored.

Each separate organ, then, enjoys two distinct relations; the one with its fellows, the other, with what is exterior. In the present chapter, I am to consider the system of forces and movements, which put living creatures in the latter relation; or by which they are enabled to enjoy the benefits arising from structural adaptation to habitation.

Generation, growth and decay, are action. Each distinct organ does something distinctly, enjoys a mode of motion, comprehended by Blumenbach under a "*special force of life.*" Mastication, insalivation, deglutition, stomachic, duo-

denal digestion, chylous absorption, hæmotosis, final assimilation to the specific tissues, are but the action of prehension continued. The synchronous disintegration of the organism by absorptions, which restores the bodies prehended back whence they came, is still the same action progressing. So that if each modal structure has a motion proper to it, each organic element dances in a continuity of progressive movement from prehension to vital elimination. The motion begins with, and terminates in what is exterior. Or the alible matters drawn into the living vortex, after having undergone the identifying changes demanded by each organ, pass off by a centrifugal movement.

We know the absolute dependence, subordination of volition of all living motive power, on assimilation. "L'excitabilité," observes Tiedemann, "est communiquée par l'activité formatrice des organismes générateurs à la matière plastique des germes, avec la propriété de prendre forme sous certaines influences extérieures. L'excitabilité des organismes et de toutes leurs parties ne subsiste qu'autant qu'ils sont nourris. Toutes les influences qui changent l'état de la nutrition en général ou dans quelque partie apportent aussi du changement dans leur excitation. Un changement d'excitabilité accompagne ceux qui ont lien dans l'état de la nutrition du corps entier et de ses parties pendant le développement des divers corps vivans et durant les périodes de leur vie. Toutes les influences qui arrêtent la nutrition et anéantissent la force de formation ou de nutrition détruisent l'excitabilité."* If the vital motion originates in assimilation or its cause, it is in the voluntary acts it curves round to form or complete the circle; since, to the series they form, appertain the prehension of the alimentary substances.

The light does not shine equally bright on every part of this circle. We do not see the connection between the conversion of foreign bodies into the animal tissues, and the mind exciting movements in the muscular apparatuses. The mechanism, by which matter *digescent* enables the mind to excite motions in matter *digested*, or the muscular substance,

* Traité complet de phys. de l'homme, part ii. p. 757.

is veiled in original creation. Nevertheless, from observation such is the order of nature; such connection really exists an insolvable fact.

The organs very generally combine to form apparatuses. Their functions group with them. The brain, lungs and heart, in the more perfect races, hold mainly the economy under immediate dependence. Movements begun in any organ never terminate in that organ, but always beyond. They are endless in their sequences. From the nutritive aperture to the extremity of the chyliiferous vessels, for illustration, we may observe the number of organs, and the variety of actions or functions. The trituration by the teeth is purely mechanical; the changes effected by the salivary, bucal, gastric, pancreatic, and biliary secretions, are each molecular; the absorption of the chyle, its motion toward the heart in the lacteals, are separate phenomena. It appears to cost the economy many efforts, much labor to identify foreign bodies. It unites, multiplies force upon force to overcome the forces of the external world, which evinces its own comparative weakness.

But where is the fountain, whence flow these motions, which animate every living fibre, every atom? Volition—all vital motion—we see, is put in evidence by the action of the original power of life imparted to the germ, on foreign alimentary bodies, or by their identification with the living liquids and solids. It is a phenomenon of this formative power. Research carried thus far, circumscribes all valuable ends, since it is not the nature of beings themselves, but their phenomena, and the subordinating laws, which constitute the materials of all just scientification. But philosophers have not been content with beholding the living movements thus *in natu*, and have attempted to soar with them to a higher, more recondite origin

SECTION I.

SYNOPSIS OF THE VIEWS OF ANTIQUITY ON THE CAUSE OF LIVING MOTION.

BECAUSE motion in its nature is incomprehensible, Zeno, Cronus, a host of philosophers have denied its existence. "If motion exist in a body," says the latter, "it must either move in the place where it is, or where it is not, which is impossible." Borelli, Keill, Young, respond, "it is the change or successive passage of a body from place to place." The principles of the moderns are demonstrated in a thousand works.

Mankind have had no difficulty; they intuitively believe in the existence of motion. The mind in its rude state, the unlettered of all nations and ages, have considered the Sovereign Will, as the sufficient reason of all the revolutions and movements in the world; and, consequently, the cause of all human actions as of being. This generalization of all motions, mutations, events—this absorption of all physical phenomena into one great solitary idea—was the philosophy, if I may so call it, of the first men; it will be that of the last rude age which will come.

If we examine the written tablet of human thought, we shall behold philosophy, religion and medicine indissolubly united. This union is natural: The knowledge of cause and effect is philosophy. The elevated rank, ineffable nature of the highest Cause would command the admiration, and worship of men, which is religion. The consciousness that this Cause is intelligent, and holds under control the destinies of mankind and of the world, would be sufficient to induce them to look to It for aid in the seasons of sickness and distress. Accordingly the ministers of the sacred altar were the ministers of medicine.

This tablet shedding its light on the gloom of antiquity, part colored by the darkness of time and of fable, part white with modern light, shows, that Asia, where human contemplation was aided from above, first reduced this cause to form.

That this form was early carried into Egypt, where it was remodeled, and diversified to suit the genius, circumstances, and wants of the people: And that all the gods or their prototypes, who have been worshiped by civilized men, came originally from the older states of Asia or Egypt.*

The ancient Israelites, Chinese, Indians, Arabians, Persians, Egyptians, Chaldeans, Greeks, and Romans, rendered homage to the gods of their ancestors with full confidence; attributed the whole course of nature, all events immediately to their will; and regarded all research for any other causes as superfluous and offensive.† As yet reflection, I may say, had but few wants. Men, by considering all effects as the acts of their Creator, lived perpetually in his presence, which stimulated their piety, and gave ardor to their devotions.

To the eyes of ancient Palestine, He was visible only in his acts. His throne was attended by the Seraphim and Cherubim; and "clouds and darkness hung round about." Plato, contemplating the mechanical soul of the world, elevated his vision above the clouds of speculation, which hung over Greece; and reached the pure idea of his ancient fathers. "Beyond the firmament," as it may be translated, "in the superior regions of eternal light, the first and most perfect of spirits dwells in unchangeable tranquillity. He lives the supreme and eternal Intelligence, who created the universe after his own image, ineffable model of order, beauty, perfection and reality."‡

The author of our being, in the cool of the day, frequented the garden of Eden, and gave oral instruction to the first father of men. What has banished this idea simple as beautiful of his personal presence, and society, and exiled Him on foreign shores? this idea, instruction long remembered and cherished by the early fathers of human kind, of nations. For many long ages now we have reached Him only by travelling through a vast distance of rugged thought; our

* Vid. Chapter 2d of this work.

† Vid. Sprengel, *Histoire de la Médecine*, tom. i, p. 215.

‡ Phædron, p. 204. Nothing, however, but Plato's language can truly speak Plato.

theologies fatigue reflection; we reach Him exhausted. His idea once so easy of access, demands the utmost labor since men have become wiser. But what has overthrown this plain and easy philosophy once universally popular and accredited, which delighted to regard all the operations of nature as the expressions of his will? The record of inevitable events show, that many causes operated. After the destruction by water and the repopulation of the world, barbarism long continued. In progressive time, the light of research began to break forth in the early peopled parts of Asia, and in Egypt. Countries became worth fighting for. The busy power of war, progress of knowledge, arts, commerce, intercourse of nations, diffusion of languages—the thousand external circumstances, which ever modify the aspect and fortunes of our species, gradually changed the original manners and habits of the people. The old gods and the simple religion of the first men no longer suited the wants, the public taste and the genius of nations. They fell gradually into disuse, the ancient religion of Palestine with a few exceptions surviving the wreck of all others.

But the new gods, as we have seen, were not original models. The copy brought from Palestine, and the early modifications in Egypt, contained all the mother-ideas of the new divinification.

The beginnings of knowledge, the philosophical notions scattered abroad in the countries, which had originated them, had never been collected together in form. The glory of doing this was reserved for the Greeks. They were descended from the Caucasian, the imperial branch of the human race. Their country extending far out into the sea by its numerous promontories, against which the waves ever raged and foamed, inspired sublime emotions. Animated, in the opinion of Sprengel with whom all historians accord, by the bold outline of their Arcadian mountains, the picturesque scenery of their habitations, and the cerulean tints of the sky, which covered them, they conceived the most ardent love of knowledge. It was not without reason, the Muses were born on the tops of their mountains in place

of elsewhere, that Olympus' top sparkled with ambrosia, and Apollo's lyre was heard there. They felt and personified the impetuous force of inspiration without. Nature had formed their country for the heart, for energetic, elevated contemplation. Their country was formed for them and they for their country; happy union. They honored virtue; raised altars to Misericordia, felt all that was beautiful in the heart, noble in thought, grand in imagination, of which they have left eternal monuments. To strengthen the ties of government, for the dispersion of general intelligence and promotion of piety, they instituted stated games and sacred festivals. They presented the world with the flower of patriotism and humanity. It was the stimulus of such noble sentiments, that caused Alexandre, in accordance with the public wishes, to recall the exiles whom Nicanor had banished to be present at the country's games, and the Spartans, to grant an armistice of forty days to the Mes-senians, to celebrate the approaching festival of Hyacinthia.

If they carried the love of country, philanthropy beyond all former limits, they excelled all other people, according to M. Le Clerc,* in the ardor and constancy of their religious devotions. Among such a people, in such a country, knowledge could but be an urgent want. Stimulated by this want, they travelled into all countries, where there was any hope of gratifying it; and collected together for the first time into a body the sparse and feeble rays of light, which incipient science had shed on the world. Fecundated by this light, they subjected the phenomena and order of the universe to a more rigid examination; perfected their language, in which philosophy and the Muses could articulate; which became at once the vehicle of all arts and knowledge, and the sacred depository of the truth of Heaven, to all future generations. This examination conducted to a deeper insight into the hidden relation of things—to the discovery, that matter is manifestly animated by forces inherent in itself, forces, which are the immediate causes of all its operations, effects.

* The religion of the ancient Greeks.

Thus, the research of reason established intermediate principles, to which all the phenomena of natural beings are to be directly referred—*discovered that the universe is mechanical*, and placed its action on new foundations! These principles in the new philosophy took the place of the Divine Will in the old, and elevated It to a more isolated, exalted station. Nature since in the eyes of enlightened men has been guided on her course by secondary causes, over which He, in sublime, unapproachable solitude, holds the sovereign control.

Accordingly, if a few patterns of the Divine Nature served for the formation of all the objects of worship of all early enlightened people, a few ideas descended from antiquity have formed the basis since of all philosophical systems. These ideas are those of *elements*, *atoms*, monads, *ενορμῶν θεῖον*, numbers, *πνευμα, θεσμὸν*, et cet. They are all either the primordial principles out of which the world was formed, to which its phenomena relate; or powers created expressly for the administration of its government. These principles connect all the parts together, co-ordinate their efforts, direct in their mechanical action, and produce such forms, properties, qualities, effects, and revolutions, as the eternal Mind ordains, who holds empire in them, and rules absolutely the universal whole.

Θεῖον*—interventional between what is physical, and what is divine, is immediately subordinate to the Sovereign Will, the highest of natural causes, and achieves, as intimated, certain effects and revolutions in the world in accordance with It.

Much perplexity, difficulty exist among the commentators about the true meaning of this term as used by the Father of Medicine at Cos. Galen understands it to be some peculiar constitution of the atmosphere, or cause which modifies its states. Fabricus, Pichler, Schulze, Godfrey,—adopt the same opinion.† Fernel, Gorraeus, Valleriola interpret it to be a cause, which acts on the whole

* Vid. the meaning of this word at p. 110 of this work.

† See this term in the Dic. des Sci. Méd.

substance of the human body, and infects it with "supernatural venom" in murderous epidemics. With Mercurialis, "it is the influence of the stars upon the atmosphere." Fœsius takes it to be a figurative expression of a natural cause, and means the same as Homer, when he attributed to the arrows of Apollo the plague, which devastated the Grecian army before the walls of Pergama—by arrows representing the burning rays of the sun producing putrefaction and contagion. Ranchin, and Prosper Martianus recognize it to mean the empire of Demons over our bodies. According to Sebiz, Jordan, "it is what is concealed from all sense and reason." Le Clerc, Schmidt, Wolfg, give other discrepant opinions.

θεῖον—*Heat, pure fire, calorificity.* There can be no difficulty in understanding the true meaning of this term of the ancient philosophy, as an intermediate and governing cause in nature.

In combination with light, heat is darted by the orb of day throughout, and beyond the sphere of the great solar movement. Orpheus* made light the first principle, and ruling cause of all things; Milton in imitation, the earliest or first product of nature—

"Hail, holy light, offspring of Heaven first born—"

The solar fluid, busy, energetic power, agent of worlds, in ours holds under its immediate dependence, a prodigious amount of phenomena and their causes. So great is its energy, and obviously striking its influences, little as they were known to them, that the sages of antiquity, as I have already noticed, regarded the celestial bodies, whence it comes, as the sources of all life, existence. By Hippocrates and his early imitators, we know, that *θεῖον*, by which can only be meant an emanation from the sun, or a similar nature, was considered as the principle of intelligence, and the organizing cause in the animate creation. M. Virey, in his elegant way, calls the sun "the star of life as of day." The *imponderable biotic* of the German medical neology, may I remark, can differ but little from the *θεῖον* of Hippocrates;

* Verses.

and must look to the sun as the great store-house, and galvanizing organ of the world.

Numbers.—Numbers figure in the early history of philosophy. Their introduction is attributed to Pythagoras. In the opinion of some theologians, frequent allusion is made to them in the sacred writings, particularly to the numbers seven and twelve. Clemens can see in this philosopher the prints of the ideas of the Hebrew legislator; and Gale quotes many of the fathers to show, but without any proof, that Moses was his philosophical prototype. What appears, however, to be certain, is, that Pythagoras studied many centuries afterwards in Egypt, where this great theosoph and prophet himself had been educated, and where numbers in a mystic or hieroglyphic sense were taught.

Amidst uncertainty as to the use, it is probable Pythagoras represented by numbers, as the exponents of unknown quantities, the Creator and first principles or elements of the world. By the number one, he symbolized, that the universe had a solitary origin, which is the first and highest, the eternal One or Monad. According to the explanation of Sprengel, the primordial Pythagorean matter, is to be considered indeterminate, and receives existence only by the addition of definitive and active principles. There exists nothing, which can better be compared than numbers to the indeterminate mass, as well as to the principles, which class and define them.*

Sprengel, therefore, who allows great weight of authority to Aristotle in this matter, and but little to Sextus Empiricus, does not understand the sage of Samos to mean by numbers the elements and active principles of things themselves, but only the means, by which they may be symbolized, appreciated, and reduced to comprehension. The mystical powers of numbers, which determine all the changes and operations in the universe, he regards as false Pythagorism, introduced afterwards by Moderatus and Nichomachus.

The cabalistic knowledge of numbers appears to have early been introduced into the Chinese empire, contained

* Hist. de la Méd., tom. i. p. 230.

in the book of the Y-king or Shu-king attributed by some to Con-fus-te. The account contained in this book, according to the notice of Von Müller,* favors most the explanation of the use I have first given, and accords but little with Sprengel and Aristotle.

Mystic numbers immortal in the hands of Pythagoras, as the instruments of thought, offered the first explanation, the human mind ever attempted, of the origin of all bodies from elements, and established distinctions between the operations, being of the world, and the Divine Author.

With the first sages, he considered fire, the cause of heat, as the only source of all the activity, which reigns in the universe. The cause of organization and life resides in heat; the principle of movements or power of living mechanics, in the soul. The soul is of an ætherial, or airy constitution; and emanates to every order of life from the universal soul of the world—the eternal fire, which overpowers all vision seated unapproachably in the Empyrean.

With Pythagoras, all the philosophers of antiquity taught the formation of the world from incipient matter, matter unformed, chaos, corpuscles or atoms. They differed much as regards the manner of their existence, and transition to the cosmic forms. They looked upon *fire*† as nature's great active force, as well as the vehicle of the principle of all animation; and a subtle, igneous vapour, thin air, or pneuma, as the immediate cause of all vital activity.

Homeomerics.‡—In the theory of homeomerics invented by Anaxagoras of Clazomena, the first pagan vindicator of the immortality of the soul, the motions of the living economy, the same as Pythagoras, are attributed to æther or air.§

* Univer. Hist.

† The inspired prophets call God "*a consuming fire.*" It happens the metonymy of these prophets is the *true substance* of the Pythagorean Divinity.

‡ There can exist little doubt, but this homeomeric theory is the venerable source, whence have flowed the attractions of opposite tendencies of our modern science.

§ With some other of our learned moderns, Børhaave, in the supposed

This celebrated theory formed to explore the origin of the universe, contemplates the eternal spirit bringing into union the atoms of similar natures, at the moment, when the radiant spheres first mounted into the vault of night to chase the Erebic shadows. They fly on springs of fire, but living bodies are animated with winged breath. O beautiful light of Anaxagoras! which put to flight the eternal shades, images of death, which preexisted the movement of creation. This winged breath, this pneuma impressed on the original of our species at the hour of his formation, essence of all vital motions, Heraclides derived from the evaporation of fire; and with Democritus, considered it identical with air. Consigning to Genii, as divine agents, the immediate production of the material forms, as well as those of all lives from poly-angular atoms,* these atoms, the work of the Divinity, Plato maintained, that all the acts of living creatures are due to a subtle spirit or æther. This æther exists in the ambient atmosphere, is absorbed, and conducted by appropriate vessels to the heart, which it animates with motion.

The ancient poets and philosophers regarded Iao, Iatreus, Jove, in some manner, as having always existed without beginning. He is the father of gods and men—of all things. The pneuma or soul is an emanation of his divine substance. The atmosphere everywhere diffused, is the emblem of his manner of existence, since, like it, he is in all places at the same time. Thus *Maro—Jovis omnia plena*.† From the manner in which Theocritus limits the flight of the Muse, we are to infer, that all things terminate in him as they are derived from him—*ἐκ τοῦ ἀρχώμεθα, καὶ εἰς Δία λήγεται μῦσαι*‡—He is the animating principle, the universal soul of the world—*Jupiter et læto descendet plurimus imbri*. And again—

Tum pater omnipotens sæcundis imbris æther
 Conjugis in greinium lætæ descendet et omnes
 Magnus alit magno commixtus corpore fœtus.§

preternatural spiritualization of his understanding by abstinence, drank deeply into this Grecian idea.

* Timæus, p. 478.

† Bucolica 3. 60.

‡ Idyl. 17. 1.

§ Georgica 2. 325.

In this passage we see, that æther or air, mixed with her great body nourishes all the offspring of the earth, here styled *conjugis*, because they are from legitimate union, is identified as being the Omnipotent Father himself.

This physiological doctrine of Plato, that the soul or æther, which governs the body, is absorbed from the surrounding air, through which the universal soul is diffused, is so often expressed, or allusions made directly to it in the writings of the ancients, we cannot doubt, but it was the doctrine generally accredited, and entertained among all, who made any pretensions to learning.

Jupiter originated life, but Phœbus or Sol, his son, whom Latona with Diana, *uno partu*, bore to him, was its glory, and accordingly was styled *φῶς βίω*. Since he invented the healing art, this title probably was not altogether bestowed upon him because of his vivifying rays; but because he was the fire itself which organizes the body, as held by the reigning philosophy of the time.

But to pursue this inquiry further, would be disproportional to the limits of our work. What have we learned, precised in relation to the immediate causation of the living movements? A primeval, eternal Fire dwelling above in the unapproachable sojourn of the empyræum, originated the universe. Its magnificent forms were not the first efforts of this ineffable fire. They are the offspring of intermediate natures, which form universal union, and subordinate all to the empire of the empyrean Tabernacle. Fire reigns in nature the cause of all material motions. In it exists the cause of all organization. From it is exhaled the principle, which impresses the totality of the living acts.

We have advanced but a single step—that of intermediate or secondary causes, which distinguish between what was original, and what had a beginning. And when we have made this step, we reach the boundary of instruction antiquity has left us. For all they have said about the mechanism of the spirit of air or pneuma, its transition to the heart, fermentation in the blood and other humors, is unanatomical, and discountenanced by our modern sciences.

The air itself is one of the dependences of all vital activity; and most if not all the molecular changes in the states of its oxygen, are attended by the evolution of sensible heat. But in the absence, night of chemical knowledge, they were misled. Besides wrong theory, one of their greatest errors was the admission of only one immediate cause of excitement, the soul or will. They could not, however, have done otherwise, without breaking down all systems, which time alone destroys. For the souls of all lives being the compendious substance of the Divinity, it was reasonable they should participate in the universal government, and rule the organized body, the microcosm.

How slow and crooked is the motion of thought, as it winds through ages in the pursuit of truth and science! And how strange—*res mutatae cum temporibus mutatis*—the philosophy we cherish, which investigates the causes of separate phenomena, would have been esteemed impiety and blasphemy in the age when men knew only but one cause for these phenomena.

Approximations have been made, and truth placed on narrower ground.

SECTION II.

GENERAL IDEA OF MOVEMENTS.

LET us conceive a number of series of actors associated or placed in the sphere of one another's influence, each actor endowed with the ability of originating and suspending motion at pleasure or of itself.

1. In this case, each might commence its effort at the same moment, and, if they be equal in power, the movement continue without passing beyond the source whence it emanates. The effort of each like its actor would be dissociable, individual; and the movement of the whole a perfect discord. For to admit the contrary, would be to admit, that the same motion can pass in different directions at the same time.

2. The first of the series commences-effort; the balance

are at rest. The motion progresses downward, but some one of the series, by virtue of its innate mobility, begins to act; the consecutive motion reaching it, will be arrested; and the two parts of the series be animated with independent, discordant movements. Neither of these two forms of motion *uncosmic*, exists in nature.

3. Contrarily to this position, the actors enjoy simply mobility, and of themselves would never produce any of the phenomena of motion. All efforts are in mutual dependence. In such a constitution of forces; any movement impressed, begun at any one point of the series, might pass to any other point; from a solitary effort, myriads of others might arise without any addition of power—condition of the universal equality of action and reaction.

This is the great model of the universe, the eternal circle of motion of Empedocles, in which the energies of all visible created beings are engaged, which evolves their phenomena, measures out their duration, and assigns them their limits. Although the corporeal and vital movements differ in the extreme, they are both in mutual dependence, consecutive, and the model, the same. And, if the attractions of body impel on the routes of space, and the molecules, through the changes of form, the sole attraction of the organic plastic nature gives the impulse to all lives through all duration.

SECTION III.

APPRECIATION OF THE STIMULI OR INCITANTS.

Motion, which among the Scholastics was the object of furious discussion and controversy, that uselessly wasted centuries, in its nature is unknown. There is no being in the universe exempt from its laws. In it, all ceaselessly advance forward to a destiny concealed in the night of futurity. All changes in the qualities, properties—phenomena—of beings are inconceivable without motion. So great is the value of its knowledge, that Aristotle said, "*motion being unknown, nature would continue unknown.*"

The immediate causes of the living motions are termed stimuli. All the living parts through their functions excite one another; as in the synergies and sympathies of health and disease, and are true stimuli. The mind by the will, by all its sentiments, as I have faintly sketched in a former part of this work, acts on the organism, and is likewise its stimulator. All the forms of matter in the universe foreign to the organs themselves, are capable of producing changes in them, are their incitants. All oral and written language; arts, science, history, literature, philosophy,—gain access through the mind and modify the living action. The theosophs extend the operative sphere of inciting power to man to still greater limits. The world does not contain all the agents which can stimulate his living functions. He is susceptible of excitement from a higher source. An action comes from the Divinity and touches him—stimulates him to the purification of the heart, to the rectification, “newness of life;” and to the “blessed hope” of a perfectly sorrowless, happy futurity. From how many quarters, from what diversity of beings, things, do the excitements come which are the true living functions? How can I appreciate them? the field of these stimuli is every way boundless! Man is both the compendium and the flower of the world. The magnificence, charm of a perpetual life allure him; the beauty, splendor, glory of heaven attract him; the shades of Rhadamanthus affright, repel him; the stars stimulate his vision, and invite him to come up in thought, and converse with their great order; the earth stimulates his active, alimentary life. How tactile the mechanism of his life to respond to all these stimulators!

Since animals need the continual intercourse, support of their world, the will, which administers this support or achieves the external relations demanded by the conditions of their being, among the stimulators, occupies the first rank. Accordingly, a certain portion of their structures is subjected to its action, and constitutes its empire. We have just seen the ancients made the mind the universal inciting power, which governs the body. It is only one among the myriads

which animate it; and its actions, like those of all other stimuli, take place through the intervention of the nervous agency. It can only produce movements in the muscular apparatuses of parts supplied with cerebral or spinal nerves, or nerves of a *cerebro-spinal* origin. It only commands in its action a part of the nervous system. The will, or what is the same thing, the mind ordering movements, by affecting the special muscles of parts subjected to its control, changes their position. It moves the whole body by its operation on the musculo-locomotive apparatuses or organs. But all the body is passive in this movement, except the organs themselves in which it determines the nervous influence. It is the same case where the movement is only of a part. The motive power of the will is expended in the muscles. Its direct action extends no farther; and the whole or the part is moved through the *osseo-muscular* attachments. The amount of organized matter, consequently, in any living body on which the will, through nervous intervention, can directly determine movements, is inconsiderable compared to the whole.

Upon a general view of the subject, there can be no doubt but the changes, the ceaseless revolutions of which man and all animated beings are the perpetual theatre, are due to the nervous organ or placed in its subordination. According to Haller and the actual lights, the will operates through nervous agency on irritability, and produces its excitements. Like all the material incitants, it is merely, as Dutrochet terms it, a "nervimotor." Irritability, the will, and the nervous influx, are the primary elements of all the voluntary acts. The influx or irradiation of the nervous matter in the voluntary muscles, is the immediate cause of these acts. The will achieves this irradiation. Irritability is an organic property, the nervous agent, an organic substance, and so far as these two are concerned, the action is to be regarded as that of matter on matter. But the will subverting the nervous equilibrium, and concentrating the nervous power in the muscles to be moved, is the action of spirit on matter.

This whole action is involved in much perplexity, ob-

scurity. The operation of the will is on the nervous substance; the voluntary movements are the sequences of this first operation. Irritability one of the elements, like all the vital properties, can but be an attribute of the attractile, plastic force imparted at first to the ovum by the generating act. The manner of manifesting activity by the nervous agent, declares it to be polaroid, or of a nature which condemns most if not all the essential properties of matter or body. We know absolutely nothing of the constitution of the force which chemifies living bodies. It offers itself to our observation in the phenomena of irritability, sensibility, the laws, by which it develops its organizing action, and in these phenomena, we see nothing that savours of materiality. The expression, therefore, of the action of the will or of the mind on matter, as matter is defined, is extremely doubtful as to correctness and truth. If we say tangible, ponderable form is only one mode in which matter exists in nature, and there are other modes, the chances for correctness would be improved. Man must trace the mechanical order; must see every thing in distinction. This explanation of the mechanism and action of volition bears the specific impress of his genius, of his weakness.

In many of the pathological states, as in chorea, the various spasmodic affections, actions take place in the organs subjected to volition, often violent, and more powerful than the will can produce, without any interference of its agency, and in despite of all its efforts. So that the will is not the only cause of movements in the parts on which it is accustomed to act. Any lesion too made in any part of the cerebro-spinal axis, will excite motions independently of it, as is abundantly manifest from the experiments of Flourens, Legallois, Foville, Philip, Bouillard, Pinel, Grand-Champ.

Do these involuntary acts take place by the concentration of the nervous influence in the muscles in imitation of the will? There is nothing which proves it to be so; the unity or integrity of the nervous organ alone is indispensable. Lesions and muscular excitements appear to relate directly to each other as cause and effect. If, then, these excitements

and those spasmodic movements can occur without the will, or so far as we can see, any other condition than that of the unity of the nervous tissue, the position, that the action of the will is by concentration of the nervous influence in the organs to be moved, occupies, at least, doubtful ground; unless it be admitted, the nerves have as many specific modes of activity as there are stimulators.

For two centuries now animals living and dead have been fully, and freely dissected; nature has been tortured and interrogated. She speaks in but one voice; has spoken enough for the immortality of many of the lovers of her truth. The facts she clearly discloses serve manifestly for the basis of the systems of our illustrious men, as the facts she conceals. The disagreement of these systems is the proof. Posterity will have trouble, who will be our critics. The insatiable desire of knowing is born in the human bosom, and what is inevitable, science will extend its attractive form over the dark as over the enlightened phases of things. Could we know dynamically the great union of mind and matter, we probably might explore what is now far above our comprehension, and arrive at some insight* into nature's high divine mechanics.

If, however, it were granted, that the theory of the determination of the nervous influence accounts satisfactorily for the phenomena of volition, there are other actions of the

* Mr. I. Taylor has recently indulged in some magnificent speculations, as to what might be the results, could the power of volition, as it exists in the living, be extended by the mind to anorganic bodies. Armed with such a power over matter in both the living and azootic states, he says, "The seraph, who steers his course from sun to sun, and overtakes the swiftest of the planets in its orbit, may corporeally possess an invisible and imponderable æther, or (which is equally credible) he may command a gigantic body solid as porphyry."—(Phys. Theor. of Another Life, p. 52.)

But in the region beyond the tyranny of facts, the flight of philosophy is easy and boundless. In place of finding out the governing laws, the mind conceives them, of investigating facts with the scalpel, crucible, optic glass—the unwieldy, troublesome apparatus—it originates them, and disposes of them in an order conformably to the laws it itself creates. About to turn Homer into English, Cowper remarks, "to translate in verse is to dance in fetters." So is the research of laws and of facts, which already exist, such as nature.

mind on the organism to which it could afford no solution. For, certainly, the slow wasting of grief, the melancholy which "gnaws on the damask cheek," could not be explained by the concentration of the nervous power on the parenchyma of the organs. From the phenomena, we should be inclined to attribute them to any other condition. Nor could we suspect the effects of sudden fear—"quum steterunt comæ, et vox faucibus hæsit—et qui gellidus membra quatit, gellidusque coit formidine sanguis"—due to the accumulation of the nervous energy in the sanguiferous system, the skin, and subcutaneous organs.

Contrarily to the theory, the appearances would warrant the belief that this energy is repelled or completely annihilated instead of being concentrated. The lively vibrations of the heart, the fulness of the capillary circulation, which joy produces, would seem to indicate the abundance of this energy in these structures. But this same energy is exalted, excessive in all acute inflammations. The mechanism of voluntary muscular contractions, of joy, and inflammation cannot be the same.

Indeed, if the mind act invariably, as must be the case, on the organized matter through the intervention of nervous agency, every distinct emotion, operation, demands a separate manner of application of the power. The suddenness with which a thought will explore the living organism armed sometimes with death, the instantaneous rubescence of shame, paleness of terror, the rapidity of volition, would, nevertheless, seem to indicate the immediate application of the inciting power. From various considerations, M. Pariset* is inclined to a similar opinion.

This action of the mind on the living body, which subjects to a considerable extent the world to the empire of the will,—to the power of man and animals,—has constantly received much labor, and undergone the most rigid scrutiny of philosophers. And although the manner in which it takes place, cannot be precised, or profounded, truth has been brought into a very narrow compass. No organ has

* Vid. tom. xvi. Dict. des Sci. Méd., article Force.

the power of self-motion. Every part of the organism has been placed by the hands of nature in dependence upon appropriate stimuli. Thus the heart waits for the blood, the eye for the light.—The integrity of the nervous tissue, as I have said, is essential. This integrity, consequently, and the stimuli are alone the conditions indispensable to the actions of vitality. And the will, so far as the simple muscular movements are concerned, is properly a stimulus, and relates to volition as cause to effect.

Professor Barthez has labored to establish that, “the integrity of the organic and sympathetic communications of the sanguiferous system with the muscles, is as necessary to the perfection of their movements, if not in the same degree, at least in the same way as that of the nervous system.”* It can only be remotely so, and the manner must be different. In a community of organs, such as a living body, arranged in subordination, whose actions are reciprocal, and form a continuity of cause and effect, any one of them endowed with a capital function, must have the same influence and relation with the movements in question. The arteries supply the muscles, as all other parts, with the elements of their composition. The only direct connection they can have with the muscular system must be either nutritive or mechanical. Like the nerves, they cannot provoke movements in this system. The integrity, therefore, of the arterial vessels, or their communications cannot be essential in the same degree, or operate in the same manner, as that of the nervous tissue in producing such movements. The complete value of Prof. Barthez’s comparison may be estimated in this; that all living motion, all the functions, as I have before noticed, depend directly and reciprocally on a solitary function or act of the plastic vivifying force, *that of identifying or converting foreign bodies into the living tissues—nutrition*. All the functions in their last analysis can but be the varied reactions of this force, transmitted, kept alive by generation, on the external world, of which the nervous organ is the primary capital instrument of communication.

* Nouv. Elémens de la Sci. de l’homme, tom. ii. p. 107.

—*Primary*, because it is charged with commencing and continuing all efforts; *capital*, because all the functions are placed under its subordination, through whose organs accordingly its substance is everywhere diffused.

The clear, neat conception, consequently, of all vital efforts among which volitions form a class, must be as I have said, that of the integrity of the nervous organ and a stimulus.

A drop of nitric acid, any stimulus applied to the external extremity of a nerve, puts the muscle in play to which it corresponds. The stimulus of volition, if we say it descends from the brain, affecting the other extremity, if the muscle be voluntary, produces the same result. Philip cut the pneumogastric nerve of a rabbit, applied galvanism, procured digestion of the food, and concluded the galvanic and nervous fluids are the same, the same effects being produced. What shall we say? any material stimulus and the will are the same, both being capable of exciting the same muscular action, or that the will is only a stimulus. They both stimulate the muscles. But in the one case, the action is simple, anomalous, and bears no proportion to any thing beside; in the other, it is complicated. It comes forth in relation to the torrent of events, has its appropriate place in the universe or in surrounding circumstances. It plunges the dagger in Cæsar's body; frees the "eternal city" in popular opinion from the rule of a tyrant, and secures civic liberty to millions. Or it opens the fabled box of Pandora; brings fire down from heaven to animate the statue of Prometheus; gives to marble and canvas the living expression.—It is the action of august reason, intelligence expressed by the voluntary organs claiming its right, establishing domination over the external world.

The will is more than a stimulus. The simple muscular action of the two will only compare. The action of the one, so far as external circumstances are concerned, is a simple, solitary sequence; of the other, the sequence of sequences, tending to the accomplishment of remote events judged, foreseen by the mind.

Although all living phenomena must be from the action

of stimuli, in many cases this action is extremely obscure ; and in some, even, all traces of it disappear, and the very negation of it seems to hold in its place. In all such cases, however, the action itself of the organism must be proof of the operative presence of a stimulus, since, in such a constitution of dynamical forces as it forms, such action would be an effect without a cause, which is unphysiological, uncosmic.

We are entirely sensible of the continued, constant action of innumerable stimulations, as in all the external sensations, the circulation, digestion, the secretions, absorptions, volitions. —But what causes the foetus at a certain age to leap in the maternal womb ? Immersed in a liquid of equable temperature; its muscular contractions cannot arise from sensations, from which it is principally isolated ; and its organs are accustomed to those which it does enjoy. Is it from too long repose in one position, or excessive accumulation of increasing vitality in its unfolding tissues ? If we say, in the first case, the mechanism is by uneasiness, this internal feeling is merely the state of the nervous tissue itself, and does not arise from an impression *ab externo*—from stimulation. In no case can it be determined what immediately precedes or causes the muscular movements in question. Nor should we believe the nervous system, first mover in all living actions, as intimated, is capable of self-excitement.

All observers have noticed, that the heart drawn suddenly from a living animal, will continue its movements for some time afterwards. This phenomenon has been explained by converting this activity into an *automatism*. But what is this automatism, but one of those ambitious words, which serves, where our mind cannot push its ideas after the footsteps of nature, to fill up the *lacunæ*, and conceal the deformity of incorrigible ignorance ?

The heart contracts from the presence or stimulus of the blood, but what stimulates or produces its diastole or dilatation ? Both its movements are essentially active, the systole as the diastole. The author once enjoyed the opportunity of grasping the heart of a living man. He could not in the least prevent the dilatation with all the force he could exert

—an experiment often made before him. If, therefore, the contraction is caused by the blood, the dilatation cannot be, since it occurs in its absence, or at the moment, when it is forced out of the expanding cavity.

Galen and Langrish have left their testimony, that the heart dilates to receive the blood, and not because it has already received it. M. Bérard has seen the heart of some of the *batraciens* at complete rest, spontaneously resume its action. The same phenomenon of the whole body without the heart, was repeatedly witnessed by M. Edwards. “Lorsqu’ on a excisé le cœur à une grenouille, et qu’ on l’ a mise dans l’ eau non aérée, si on attend le moment où elle a cessé de se mouvoir et qu’ elle ne donne plus de signe de vie quoiqu’ on l’ excite en l’ agitant et en la pinçant dès qu’ on la retire de l’ eau, elle commence à se ranimer et se met en mouvement.”*

If, then, the heart by its own innate force can put itself in play, although essential to the continuance of its motion, the blood can neither be its sole nor prime mover. It is impossible to decide here the way the truth of nature has gone.

But if, in the calm and tranquillity of health, when the forces of living bodies right with themselves are responding harmoniously to the forces of the great outward world, in whose immense, energetic action they are encircled, we behold movements, phenomena, to which we cannot assign the dependence, such movements and phenomena are much more numerous in the pathological states. To what cause, for example, can we refer many of the spasms, convulsions, lancinating pains, indescribable sensations—anomalous movements—we are called to combat at the sick bed—this solemn and unwelcome theatre, where sometimes we are the forced spectators of incurable agony—where the sick man lies tossed as with the supernatural power of the furies—calms—dies—in the bath of tears love sheds around him? In many cases of violent attack, we observe the forces, as I may say, running to and fro—here they have deserted the organs; yonder they exert their accumulated strength—rage as in furious combat with one another. In the dark therapeutic

* De l’ influence des agens phys. sur la vie, p. 6.

night, which yet hangs over the world, we see not what has disturbed their calm, severed their union, or stimulates to their mutinous, tumultuous movement. The scalpel, autopsy, often reveals nothing—the organs show fair, where the power of life struggled and sunk—manifest no traces of the awful, desolating action of which they had been the seats.

In excessive and frightful hemorrhages, often the palpitations of the heart and convulsions of the muscles, will be more violent as the blood still loses. Every one remembers the case of De Haen—so often quoted, but with perhaps too much confidence—of a female, who literally expired with apparently a full and regular pulse, but which dissection showed was a motion of the arteries without blood.

In these two last cases, the very absence of stimulus appears to supply its place, in producing the motions of the heart and spasms of the muscles; or, rather, they seem as has been thought by some, to arise from "*organic spontaneity*."

But this spontaneity, as already intimated, is contradicted by the very manner in which the living body is organized, and by the co-ordination of the actuating forces. If such an operative power existed, it could only act as a fetter to its dynamical enginery. All in it tends to unity, subjecting it to the action and control of a single cause—that, which through its attraction on surrounding bodies moulds the structures or engines. If, therefore, according to the emphatic expression of Galen, "the organs spontaneously come forth in action as the blasts of Vulcan's forge" through their own independent, inborn energies, their general structure conflicts with such movement. Besides, such energies, as noticed in the second section of this chapter, oppose all idea of subordinate, consecutive action, such as life.

Absolute immobility is inconceivable. Every vital as every mental and material act, is a sequence, which must have depended upon a preceding act or sequence, or exist absurdly an effect without a cause. The same conclusion, consequently, as before, is irresistibly forced upon us, that, that which immediately precedes all the acts of vitality is

stimuli offering their impressions. And, in those cases, where no traces of stimulation are discernible, or the absence of stimuli appear, to supply their place, the action itself is incontestable evidence of their active presence.

It does really appear to us, the *inertia*, with which the philosophers have clothed matter, tends much to bedim, bewilder this idea of stimulation. The bodies we so familiarly handle we regard as inactive in themselves. We do not feel their operative forces in our grasp; and cannot so easily conceive how many of them applied to our surfaces, even in very small portions, should suddenly produce such prodigious effects. A few grains of opium, or drops of Croton oil, promptly subvert the forces of the strongest man. We suppose such substances offer something peculiar to life, other than mere power, to which their effects are due.

Observation assures us, if the bodies in celestial space have not the power of changing their conditions, they nevertheless persevere in ceaseless effort. Every being in nature, to all reason, exists in perpetual action. All at this moment are performing the same movements, doing the same things, in which they engaged at the hour of their creation, and in which they will continue to *persevere*. *The displays of their activities, therefore, do not emanate from them, but go forward with them.* Thus the motion, which brings any of the earth's bodies toward her centre in falling, is the same motion that body has manifested since she has been in the deep ocean of space.—The action any stimulus offers to our living fibres, is the action that stimulus has borne to us from the hands of the original Creator, and not simply an effort it puts forth when brought in contact with these fibres. *The action was created with the stimulus, with the star, with all natural existences.* Need I say, in confirmation, that hellebore has purged in all annals of the world; opium produced sleep; fire warmed.

The incitants, then, by which we are supported, remain around us in unsuspended effort, amid which the vivifying

force displays its activity, the nerves, the immediate instrument, stimulation the manner, organization the end.

To us, this idea of ample fulness, ceaseless, exhaustless activity of nature, vivifies the conception of vital incitation by stimuli. These stimuli touch us with actions ordained to them; actions coeval with their existence; framed by the Divine Creator; come to us from his presence in these stimuli, and produce their effects by an inviolable, an original code of laws which has never been changed. They form the medium, we may think, which unites our transitive organic being here to him; through which He irradiates all the life of the world. Stimuli, and the responding organizing force, are his ministers, his means of our existence, but the streams of vitality have their fountain first in Him. We can furthermore conceive, where the action concurs so much as in life, the beauty, flower where it occupies, so delicate, easily destroyed, that agents not armed, as these stimuli, with Divine prescience, would be unfit to excite such action.

The idea, accordingly, of the *inertia* of matter, or that the incitants only exert their power, when brought in actual contact with the living surfaces, is detrimental to the true comprehension of their philosophy or active nature.

Stimuli have an elective attraction for different parts of the organism; or these parts manifest a susceptibility peculiar to themselves for the reception of their action and influence. So that, in whatever manner their contact is achieved,—whether by respiration, by introduction into the circulation through the absorption of the external or internal mucous, dermic tissue, they will exert on particular organs a specific activity. This sort of activity is very observable in many of the medicinal agents, as *nux vomica*, cantharides, calomel, tartar emetic, opium,—and in the poisons of many of the contagious and atmospheric pestilential diseases.

This susceptibility of stimulation peculiar to the distinct structures, dependent upon the modification of the vital properties of each, constituting a sort of individual life in them, gives to the incitants still more ample dominions. Their

impulses do not suspend in the organs on which they make the impressions, but expand in the consecutive movement through the synergies and sympathies of the organs in the states of health and disease. When we consider their great variety, the prodigious power possessed by many of them in the smallest portions, so much exaggerated in our day by the homœopaths, they soar in the amplitude of their forces, beyond all estimation. But could the value of their just action on all the organs, in the manner M. Gendrin has attempted for the inflammations of them, be weighed and appreciated in all the changes of health and disease, it would complete the knowledge of hygiene and practical medicine.

The energies stimuli offer to living bodies are subordinate to the molecular attractions, zootic and azootic. They create and destroy them; and in this respect, hold a conspicuous relation with the life the world nourishes. They are limited to definite combinations, and we may suppose, under such restraint, can never evolve the forms of matter in such shapes as will unpeuple the earth, although in various historical annals, such a result has been more or less threatened by the poisons of different pestilences; or afford to it a greater amount of natural health. The more we consider the range of these stimuli and their energies, the means of our existence, the more they vanish from the power of contemplation.

But among all the vital incitants, as already, that which holds the first rank and most conspicuous place, is the mind perceiving or remembering impressions. The *union* of sensations or perceptions present or recalled, with the *power* of originating and directing organic movements, forms the net apprehension of the will. I cannot conceive any thing besides in its idea. On the one side, the impressions of the external world or of the organism itself are felt and judged; on the other, movements are ordered accordingly as the tendency of the impressions is judged or valued. The innate love of life, a fact irreducible, is the law which decides the direction of the movement. Hence the acts the mind im-

presses on the body, by way of excellence and distinction, are styled rational.

Without such a power to wield all the external visible forms of creatures, which manifest coaptative relations with what is exterior; necessitate for them a perpetual sojourn in land, air, water—the inhabitable regions—and by which they carry on conservative intercourse with the world, it is plain, these forms would be mechanically incomplete. But this power which gives them functions, constitutes them all useful to these creatures, so that we may say, they were born for volition whatever may be the peculiarities of their sojourn, forms of all the inhabitable world an university, where nature lectures to the contemplation of man of the sublime wisdom, skill, and prescience of the Sovereign Reason.

SECTION IV.

FREEDOM OF THE WILL.

Is the will free? Crombie, Edwards, Priestley, have made it the topic of special treatises. Philosophers, divines, metaphysicians; all ages, find occasion for its discussion. Never has a subject been more labored, never has one yielded less fruit, and more darkness.

If the question be, *Is the will a solitary sequence or what is the same thing, self-active?*—On the one side, we have seen the integrity of the nervous organ was indispensable to all its operations; on the other, an impression felt or remembered. Like all other natural agents, its movements are limited to certain conditions, which are the laws of nature, or the ultimate facts of our reason. Volition, as other physical phenomena, consequently, has only a circumscribed sphere of causation.

Is the will free to recall ideas or stimulate recollection? We often cannot remember what we desire. The laws of mind, then, of which it can only be a property or a state, like those of the organism, fling about it their barriers. Of

one thing, however, we may be entirely certain, its operative sphere is sufficiently great to make men reasonably accountable at the public bar of their countries, and at the tribunal of their August Creator.

The hope of its future knowledge, as I have said of the mind, generally is in the study of the mental phenomena in connection with philosophical anatomy. Since all the actors or agents of nature are subordinated by the secondary laws, this question of "the freedom of the will" is unapt to just conception; I abandon it to the metaphysicians.

SECTION V.

RELATION OF THE OSSEO-MUSCULAR LEVERS TO THE INCITING POWERS.

BUT very slight observation of the manner of the origin and insertion of the muscles, is sufficient to show, that to move the different parts of the body with the least degree of power, would require an arrangement very different from what actually exists.—The origin and insertion, in some respect or other, would need a complete change. Since volume is an element of muscular force, animal motion by muscular contraction appears incompatible with organic symmetry and beauty, and general convenience. Hence everywhere, for the proportion of form, and to gain velocity, the power is wasted, sacrificed.*

The muscles of the trunk, and lower extremities, where the greatest exertion of muscular power is demanded, form some slight exception to this general law. Here, in some cases, processes stand out for muscular insertion, and the heads of the bones expand, which enable the muscles to act on the bones, at a less oblique angle, and thereby their power is augmented.† But, generally, as I have said, the muscles are attached to the bones without any regard to the saving of the power which is to move them. I do not know by any of the writers on animal physics, that the average

* Vid. Bostock's *Elem. Syst. of Physiology*, vol. i. p. 153.

Vid Borelli—*De motu animalium*.

waste or sacrifice of power in any animal, to secure the general beauty, elegance and convenience of the forms, and increased velocity, has ever been subjected to actual calculation.

Hippocrates recommended the study of arithmetic to his son Troilus, but Winslow and Borelli were among the first, who successfully applied geometry to the elucidation of the animal motions. This loss of power, arising from the disadvantageous, muscular insertion of the fore-arm, in any weight to be raised by it, was estimated by the former at about $\frac{1}{20}$ ths of the whole:—or one part of the entire force raises the weight, and nineteen parts are lost or expended by the manner of insertion.

Since, therefore, muscular power and volume are in relation, were we to conceive any creature constructed upon the principle of economizing to the greatest extent the voluntary force which is to excite its movements, its forms would be those of monstrosity. But nature, we may say, enamoured with beauty, elegance and fitness, in shaping and compiling the living forms, draws upon her own exhaustless resources, multiplies, and bends the motive power to suit the style of her labor. Thus she lavishes the immortal strength of the mind in securing the temporary movements of the fleeting organization she has united with it.

During the hours of wakefulness, our thoughts through volition, constantly agitate and keep in play the organs. The amount of action thus impressed through these organs on external objects is incalculable. The whole inhabited earth, once a wilderness, has been remodeled by this action derived from our intelligence. The forces of matter by it have been recomposed, and thrown into new channels of operation, its forms changed, and a new face exists.

CHAPTER VIII.

OSCILLATIONS, REVOLUTIONS OF THE GREAT FORCE OF LIFE IN
PROGRESSIVE EPOCHS.

ALTHOUGH all the beings of nature exist perpetually *in nisu*, constantly expend the same forces with which they were endowed at creation, their laws knowing no change; although accordingly the sun has brightened the face of the planets with the same day; the planets have travelled through the same spaces in heaven; the comets continued to drag their same trailing fires; the fixed stars to burn with equal flames; and the vital incitants to persevere in the exertion of the same influences, yet in the great action and reaction of the whole, some slight variations occur, which tend to equilibrium. Now before we advance in the next chapter to the study of psychology, we will cursorily glance at some of the accidents or circumstances of the world which tend to accelerate or retard the development of the living species.

SECTION I.

ANTIQUITY OF THE LIVING SPECIES—IMPEDIMENTS TO RESEARCH.

IF the whole mass of the earth is constantly agitated about the great central axis of the sun by the dynamical forces, the matter of her surface is not less continually and energetically agitated by the force of life. Modified as are the forms it evolves, stretching out from the hour of creation without any thing apparent, except the divine interdiction, to impede its progress, the phenomena of this as of the other original forces of the world, strike us with astonishment.

On whatever solitary lands the curious may wander; at whatever explorable depths they may reach, the ancient footsteps of life meet the eye to show that it has travelled there. Its impress is ineffaceably fixed on ancient rocks when they were young; nay, many, if not most of those

composing the terrestrial crust, are evidently the crystalline spoliation of its forms.

How magnificent the epochs the noisy pen of history attempts to fill by the side of those still, solitary measures of time, before man came forth with his letters to record, when nature was her own historian; and her life was marshaling its infant ranks to extend its empire to the possession of the earth! How deep the gulf of night they form, down which so many centuries since have plunged—haunts of the living Almighty—where men who yesterday were nothing, new to being, yet confident in their thought, fancy they hear her voice; distinguish her traces, and rebuild to comprehension the manner she has reached us!

We have observed her laws, and noticed their products. No doubt they are uniform in their operations. But as yet we have lived only a few moments in her presence; and have not seen what her laws would achieve in great durations of time. The little we have witnessed, we take to be the whole of her developments, and on it hastily rear up our fragile science. Conceive of some strangers, who should be introduced into the theatre at the moment, when the last act of one of Shakspeare's noble plays is closing, and the last words are pronouncing. They study what they have witnessed of this act, and these words in all their possible relations and bearings; and attempt to rebuild the entire action, the characters and events of the whole play. From materials so scant, they must arrive at very different results; and originate models entirely different from those conceived by the mind of the great Shakspeare. So philosophers, who only witness some of nature's acts, and a single expression of her laws, and judging, by what she does in short intervals, all she accomplishes in the great flights of time, with all the truth they may be permitted to see, must arrive, as we can but believe, at conclusions very contradictory and opposite to reality in regard to the events and revolutions—the scenes—through which she has passed—to the whole action.

Thus the growth of one country being found deposited in the soil of another—the organic productions of the

Tropics fossilized in hyperborean lands,—they conceive at some remote epoch, the two poles of the earth swung even in the great plain of the ecliptic, when an equable temperature reigned over all its surface. Such phenomena, therefore, are not to be reconciled with the physical laws, without admitting all climates, as they originally existed, to have undergone a complete revolution. Or what would accommodate the same phenomena,—in “the dark annals” the sun originally rose in Arcturus, and set behind the icy fetters of Capricorn.* So that these peculiar productions of the Tropics in ancient times flourished in these frozen regions, where they are entombed.—Or by such an altered course of the sun, darting at each revolution his vertical rays on the two poles of the earth, the eternal ice which covers them in the course of ages would be melted; and immense floods of water would inundate, and sweep over all the continents. One of such currents setting in from the South to the North,† would bear the products in question to the frozen lands of their entombment. And do not all countries, they triumphantly ask, bear unequivocal testimony, that great floods of water, at some period, have swept over their surfaces?

Many of the Testacea, Pachydermata, Palæotheria, gigantic fluviatile Saurins, Ophidians, with their congeners, have entirely disappeared. In the great course of nature, the living races are occasionally extinguished, and new ones take their place accommodated to the progressive changes of the world. Science noble, colossal in form, but feeble, yet intrepid, places one of her little hands where the hours are playing, the other on the infancy of time, and attempts to press to her heart the operative, progressive universe. She darts her eye along the shadowy path things have travelled.

* Vid. St. Pierre's *Studies of Nature*.

† According to the observations of Mr. Heyden—(Geology)—these currents on our Western continent, appear to have passed from North to South; a direction exactly opposite to those of the continents of the old world. If Mr. Heyden be correct, this hypothesis, therefore, in accounting for the direction of these currents, would meet with difficulties on every side, whether it argue from the hydrostatical laws or those of general gravitation.

But they have not always left very distinct traces over the smooth abyss they have passed. The stupendous drama of which they are a part, is still playing on ; nature, the mighty actress, is faithfully developing the great plot of her Creator. The parts of the plot to be unfolded must throw new light on those which have been acted out.

Our science has not futurity at command. Her sole reliance is on the invariableness of the physical laws, of which she cannot always be the faithful interpretress. Taking this solitary invariableness for guide she passes up the torrent of events to behold the doings of things on which the curtain has fallen. Great spaces are broken down, vast lacunæ separate them ; the lamps which once hung there are burnt out ; and the only alternative she has left of rekindling the extinguished lights, and filling up these lacunæ, is by altering or bending the course of nature. Thus, as I have said, the Southern pole of the world is elevated to correspond with the plain of the Ecliptic ; the beautiful chariot of morning is turned from the ancient gates of her "rosy-fingered," and scours up and down the frozen talus of the poles ; floods of water burst forth and inundate the two hemispheres to furnish sepulchres for plants and animals found in strange lands ; the old living races grow hoary, decrepid, and perish from age ; and a new creation takes their place.*

The motion of reason, I may say, is in a direction exactly opposite to that of nature. What she does last reason sees first, which always sets out from the *z* to progress to the *a* of things. Notwithstanding, the order she has observed in the achievement of her multiform labors, may not be so easily discernible, and liable to misinterpretation, it is nevertheless certain the individual agents, which play in her great action, have continued the same. Passed over the gulf now of so many centuries, here they are still. Here are the seasons and the hours dancing in the same circles—here over the sepulchres, which drink greedily, are dashing full the torrents of life. The indelible traces of this life, which all the forms of matter wear, sufficiently attest its restless,

* Vid. La Marck—Philosophie de la Zoologie.

busy power; and that this power has been kept in prodigious activity from all antiquity. The successive destruction of the ancient races, and the appearance of life in new and altered shapes, are phenomena, solitary facts, on which the other facts of the universe shed no light to inform our reason.

SECTION II.

ESTIMATE—VARIATION OF THE NUMBER OF THE HUMAN SPECIES.

WAS antiquity better peopled than the modern annals? what are the causes which modify population? During the present century this last has become a great question. The sciences which tend directly to perfect civilization or the happiness of our species, demand its most rigorous investigation; and, under the general title of Political Economy, a great variety of talent and learning has been combined in the exploration. The industrious arts, inventions, institutions, human legislation, general statistics, physical geography, forming the basis of Political Economy proper, or philosophy of administrative government, fall not to us. Population, in the great hands of nature, traversing ages under the provisions and limitations of her laws, or natural political economy, claims here our efforts.

History fallacious.—Since the origin of society an interest must constantly have been felt to know the number of inhabitants. The proper and judicious administration of government; the pride, ambition of rulers; the passion and necessity of war, would imperiously demand such information. Accordingly we find the first examples of such enumeration among the ancient Israelites. The number of their tribes was ordered to be taken by their rulers. In Egypt the number of births was registered; and Diodorus Siculus says, “on the day which gave Sesostris birth, seventeen thousand children were born.” We know that Antoinine ordered the names of the children to be inscribed in the temple of Saturn thirty days after their birth. Under the reign of Servius Tullius, sixty-five years after the foun-

dation of Rome, according to Titus Livy, the census of the inhabitants was taken. Tertullian makes mention of a book of life; and Cæsar carrying war into Helvetia writes:—"In castris Helvetiorum tabulæ repertæ sunt, literis græcis confectæ et ad Cæsarem perlata; quibus in tabulis nominatim ratio confecta erat, qui numerus domo exisset eorum, qui arma ferre possunt; et item seperati pueri, senes mulieresque."* The only table extant, I believe, of mortality among the Romans, is that of Domitius, in which Schmelzer discovers calculations very similar to those of our own day.

The data on which is calculated this ever varying, moving picture of the living world, are, at best, uncertain; and the truth educed from them is made still more so, by the natural proclivity to exaggeration, love of wonder, rivalry, ambition, egotism of nations, and the tyranny poetry exercises over all historical facts. Accordingly, could we credit it, the population of antiquity, as seen in history, would truly excite our astonishment. Ninus, we read in Diodorus, led into Bactriana 1,700,100 infantry, 210,000 horsemen, 10,600 chariots; and was met on the day of battle by the king of that country with 400,000 men. Twenty thousand populous villages, according to Herodotus, flourished in Egypt at the time of Amasis. Under the special direction of his Muse, as to the population of ancient Greece, what an impression Homer would make from the number who went to the Trojan war. He carefully recounts the countries which gave them birth; the number of ships in which they went; and the names of the captains who led them. From how many "reedy," "rocky," "wave-worn shores,"—"meadowy, flowery, grassy, leafy fields" they come, "glittering in burnished brass, their foreheads shorn, and wavy locks behind"—from Epidaurus "crowned with purple vines;" "Thisbe famed for doves;" from "Echinades looking o'er the curling waves"—

"Their multitude was such,
That to immortalize them, each by name,
Ten months, ten tongues, an everlasting voice,
And breast of adamant, would ne'er suffice."

* De Bello Galico, lib i. 29.

From their ships and war-tents, they poured forth in such thronging crowds that

“ They overspread Scamander’s grassy vale,
Myriads as leaves, or as the flowers of Spring.”

Vallace, in his *Treatise on the relative population of ancient and modern times*, develops a host of facts, as marvellous as they are incredible. Vossius estimated the actual population of the globe in his time to be 500,000,000; Ricioli, to twice that number. The opinion was advanced by Montesquieu, that the world was three times more populous in the age of Julius Cæsar than at the present. Contrarily, Mr. Hume maintains, “our own epoch was never surpassed in the number of living men.” In the *Journal de Trévoux*, the aggregate number is put down at 720 millions, which corresponds nearly to the late estimate of M. Malte-Brun of from 640 to 650 millions.

This enumeration by M. Malte-Brun may be considered as close an approximation to the probable truth as the subject will admit at the actual time. But now, since the sudden explosion of knowledge of all kinds, giving new life to human agency in procuring subsistence,* we cannot calculate from him the population for any remoteness of time backwards or forwards; and, especially, when we consider the varied fortunes through which society has reached us, the fortunes that await it; and all history is fallacious and uncertain.†

* How strikingly does the actual number of inhabitants of the Isle of Great Britain, and some countries of Europe, contrast with their numbers of only half a century since? Besides their improvement in the arts of the soil, statistics show, their manufacture of cotton and other raw materials of foreign and domestic industry, has given to their numbers a prodigious augmentation.

† Rousseau would not teach his pupil history as it is written; and it is not without some reason, in his feverish petulance, he poured out on it the bitterness of his eloquence.—(Emelius, tom. i.)

SECTION III.

CAUSES WHICH MODIFY THE INTENSITY OF THE GREAT ACTION OF LIFE.

It is only in the connection, the subordination of the vital to the general physical laws, and in the accidents, changes, through which our material economy is passing, that we are to behold the exacerbative movements—the contractions and expansions slow or sudden—of the great life of the world.

Excepting the heat and light, so uniform, as has already been intimated, are the influences of the other stars of which ours is a mechanical member; or rather, so trifling are the variations to which they are subjected in relation to us, that they very slightly modify our terrestrial zoography. Their occasional obscurations, apogees, perigees, conjunctions, touch with a force relatively very inappreciable, nothing. It is matter more immediately in contact;—the broad amplitude of the earth's surface, against which beats and frets the solar blaze, covered with voluble air and flowing waters, rich in the power of changing its forms, which regulates the vital impetuosity.

In the hands of nature, some of these revolutionable forms are the immediate supporters, as the alimentaria, to which human agency is permitted to give a partial impulse. All the balance can operate, modify by stimulation. Some of these forms waste, destroy life by a stimulating action offered to the living tissues, as the poisonous secretions of all contagious diseases; the Simoon of hot climates; malaria of murderous fevers, pestilences: some by a modifying action offered to the supporters, as destruction of fruitful soils by movable sands and running waters; volcanic ruptures, tempests, earthquakes; land-slips; hygrometrical vicissitudes of the atmosphere or long-continued draughts or rains; unseasonable cold; the cold of winter too long protracted.

Some of these destroyers obviously strike again in their reaction the same part of the organic chain, and give to its vitality a new impetus.

1. *Running waters*.—If these waters remove from some places the herbiferous, fruit-bearing soil, or cover them up with a layer of sterile sand; and perish out the lives which subsisted on them, they deposit again much of this same soil in low, marshy grounds, the bottoms of lakes, mouths of rivers, and estuaries of the seas into which they flow. Great deltas are thus formed by this detritus of the distant countries, through which these rivers have flown, forming a most prolific soil. The gramina, the tender, juicy plants spring up luxuriantly; the oak, the poplar, gigantic forest trees, expand their wide branches. Ceres and Flora come to establish their reign. The herbivorous races with the lion, the jackall—all find food and shelter. Man approaches with his dog, and the domestic races; and builds his hut. His race expands in proportion to his industry, and the health, fertility of the soil; and, on the very spot where the whale and the dolphin played in the waves, or where the crocodile basked in the ancient rays of the sun, soon a great city rises up, and the feet of an overgrown generation are rattling over its pavements.

Geologists assure us, at this day, similar alterations or formation of new lands are going on in the oceanic, lacustrine, and fluviatic deltas. And, if we may hazard some speculations here; from the nature of the surrounding country, we should think, the deposits now taking place in the bottom of Lake Superior, and other lakes, will one day give birth to a soil, which shall far excel in fertility and extent that of the same kind, progressing in Lemon Lake or the Lake of Geneva, Adriatic Gulf, Baltic Sea or any of the estuaries of the Old World. And that when the ploughshare co-operating with the natural causes, shall have exhausted the great inclined plane of our country looking to the Atlantic, the deltaic virgin soil of these great lakes, will be ancillary in the augmentation and subsistence of our future Americans. The formation of the great Delta of Egypt, of the great Valley of the Mississippi,—is evidently due to the action of running water. The transition more or less completely of these lakes to dry, arable land, from the menaced ruptured-

waters of one, Pres. Lyell* has predicted a deluge to our country, will not be a new phenomenon. Besides the rich provisions of life which nature has so visibly, so partially lavished upon us, she has other ample stores *in natu*. To mention no more, the growing deltules at the mouth of the Mississippi, must one day unite, and form a great body of the most productive soil. New Orleans will become a common village; when upon the uplifted delta lower down the river, the Babylon of America will rise to overshadow the grandeur of ancient Thebes, Constantinople or Nineveh; and the delta itself exceed far in extent those of the Ganges, the Po, the Isonso of cotemporaneous growth, or even the old one of the Nile.

As regards the growing lands of the Mississippi, there exist the most abundant, convincing evidence, that when such changes, as I have described, shall occur, they will not be new phenomena where they are. From existing monuments, there can remain no doubt, but that the rich prairies which occupy so much of Alabama, the Choctaw, and Chickasaw purchase, and Valley of the Mississippi, many of them ample in dimensions, are nothing but estuaries, and salt or fresh water lakes, which have been filled up, and the soil deltaic in character. "No one," says Dr. William G. Little, who recently surveyed these regions of country, "possessed of the slightest geological acumen, but on examination would irresistibly be convicted, that these prairies of waving green, the most luxuriant meadows on earth, were once sheets of standing water of considerable depth. Often," continues the doctor, "on entering one of them, you have presented before you a boundless horizon level as the sea, against which seem to strike the green billows of rolling grass; and, on either side, the tall forest trees in curvilinear lines extend beyond your utmost vision."

If you pursue one of these lines, you will soon discover it passes in places over ground considerably elevated above the level of the prairie. On the sides of these elevated portions next the prairie, you see clearly the marks or prints of the

* Geology.

waves; and occasionally, land-slips in pretty good preservation, occasioned by the underwashing of the water. You will regard these long lines of trees, which define these grassy realms as occupying, and standing on the shores or beach of an ancient lake now become a prairie.

“The banks in many places on which these trees stand, look rugged from the accumulations they contain of the remains of Oceanic *Testacea*, among which are many of the *pectinated*, *buccinoidal*, turbinated forms, the univalve and bivalve *Molusca*. The soil of the prairie itself is evidently highly calcarious; seems to be largely composed of the ruins of these shells, many of which still lie beneath the ground, and are strewn over the surface; and some look so new and fresh, especially of the species *Ostrea edulis*, one would be tempted to think the sea had but just recently retired.”

Nearly the whole face of Alabama evinces, at a time not remote, it has been the subject of great geological changes. It is the floor of the sea recently raised up, and become dry land; and these prairies were the holes or deeper bottoms of the sea, which, when upheaved, became lakes; and were at length dried or filled up by the deposits of the streamlets which fell into them. According to the observations of Dr. Little just cited, the traces of the channels of many of these streamlets, which flowed into these lakes, are still very discernible.

We know Celsius, a Swedish philosopher of the last century, avowed the opinion, that the waters of the Baltic and Northern Ocean were subsiding, and the land gaining. Linnæus espoused the same views; and, quite recently, Pres. Lyell has given the subject a thorough examination, and convinced himself of the truth of this land elevation, which extends from Gothenburg to Torneo, and across to the North Cape; a distance of more than 1000 miles. Its breadth is uncertain, though it reaches across the Gulf of Bothnia, and probably extends far into Sweden and Finland. If this elevation progress, the Gulf of Bothnia will all one day be converted into dry land; and like our Alabama, will become a country interspersed with green prairies. Already Von

Buch has seen in Norway, and about Uddevalla, masses of shells projecting from the hills far above the present level of the sea, resembling, in their situation, those I have described above, garnishing the margins of the Alabama prairies.

If, therefore, by an upheaving movement, these beautiful lands of Alabama have been raised from the bottom of the sea, narrowing up the Gulf of Mexico, we know that soils are redeemed from the waters by deltaic agency; and as above, our great northern lakes may, in time, produce subsistence to augment the number of our future countrymen, when much of the old soil shall have gone to waste.

May I say, *en passant*, since the same causes of change are everywhere in operation, when the geology of Florida, Georgia, Alabama, the southwestern States generally, shall be cultivated like that of Europe now, many dark problems will instantly be solved; and the history of truth and our world make a sudden and unexampled advancement.

Our southern universities, quiet and at ease on this subject, have opened before them a stupendous theatre for the achievement of glory. By a brisk movement, they may snatch the radiant diadem of knowledge and wisdom from the gray hairs of the old world, or will they suffer, at last, strangers to come among us, gather up the ripe fruit, and carry off to other countries the jewels, the precious ornaments, which rightfully ought to grace the beautiful person of our Columbia, the mistress, hallowed divinification of our soil?

As European geology has done for the subappennine beds, the Jury, and other cacuminal ranges, when ours shall rise, it will contrast the shells and other remains scattered over and buried in our lands with existent species in the neighboring seas; and obtain paleontologic data, by which, among other things, to explore the periods of formation.

The author has been permitted to see but very few of the prairie-shells of Alabama. These correspond exactly, being only a little larger in size with those of similar species brought from Apalachie Bay, the shores of the Atlantic, and Mexican Gulf. From all the information he can obtain, he believes there are none of these fossil shells, but what have their liv-

ing congeners in the mother waters, which wash against the shores of the country.

The freshness of the traces of the sea almost everywhere; the brightness, newness of the shells, especially of those of the *O. edulis*, as I have noticed, their exact similitude with those in the adjacent seas—all the phenomena—would point to an epoch, very near our own time, when Alabama rose above the waves to give them new boundaries—to an epoch not many centuries anterior to the advent of the original discoverer.

2. *Earthquakes*.—If they disorganize, break loose the great ligaments of countries, convulse, and dash the whole or some parts into the bottom of the sea with all the lives, monuments of art, works of valuable industry, their tendency is, suddenly or in progressive time, to raise up other lands from the floor of the deep, and present them fertile abodes to the living they destroyed in their former action.

Thus, if nature strikes with a heavy blow on one part of her organic kingdom, in her management of material changes, she returns kindly with a compensatory movement, and fills up full again the cup of vitality she had emptied.

3. *Volcanic ruptures*.

—Curvis immugiit *Ætna* cavernis—

—Horrificis juxta tonat *Ætna* ruinis,

Interdumque atram prorumpit ad *ætherea* nubem

—Attolique globos flamarum, et sidera lambit.

In her greatest torments, madness, man is not afraid of nature. He still lights up the halls of mirth, lives on the very spots where he has so often witnessed her most awful struggles, and seen his generations buried suddenly in sepulchres of fire.

“About the base of *Ætna*,” says Pres. Lyell, with all travellers, “is a delightful region of country, well watered, thickly inhabited, and covered with olives, vines, corn, fruit trees, and aromatic shrubs.” Higher up the mountain still, are extensive forests, where numerous flocks feed on luxuriant grass.

If the countries subject to volcanoes and earthquakes, fretful, twin-born powers of disorganization, when once destroyed, had remained so, to what reduced limits, many centuries since, must have been brought our zoography? In their paroxysmal burnings, volcanoes throw out their molten entrails; often inundate, as is so well known, extensive populous districts; destroy all life; fossilize cities with their inhabitants; and leave on fertile lands a sterile, vitrious covering.

But the elements forming this impenetrable covering or cement, endowed with active molecular forces, tend to decomposition. Time, which despises all duration but its own, comes in aid. The feeble cryptogames at length come too, penetrate it with their sharp roots, assist in pulverizing—proof, that “the weak things of the world are to confound the great, and the mighty.” The hardy shrubs and forest trees, follow in the train of the cryptogames; and find room for their deep roots.

Thus, again, life marshals her legions about the great circumference of this howling desolation, over which once swarmed her gay but destroyed millions. And, as if in contempt of the convulsive, volcanic thunder amid which she had been defeated, she sends out now the feeblest of all her economy to make the first assault. Her strongest forces come up in the rear. With the cereal and juicy grasses, aromatic herbage, the vine, the olive, the milk-bearing, herbivorous races, man comes too. Amid cool and fragrant solitudes, he builds his cabin on the tombs of his fathers, and forgets the blow which struck them. The rivers hollow out new channels to send their irrigating waters; and this chasm of organic being, blot of creation, is again smooth and even up close to the smoking solfatara. Nay, from the increased fertility of the soil, life has gained fresh strength, and a more powerful dominion.

The plain of Malpais, the land of the Andes, where sits the noisy Jarullo, the Moluccas, Vesuvius and Somma, Ischia, the Phlegræan Fields, Skaptár Jöcul, Stromboli,—are not defective in the richness of soil and population. Nay, the

volcanic regions of the earth must be regarded as the most productive, and abounding in the greatest fulness of life. They are store-houses of organizable matter, which need, as I may say, only the presence of the plastic, vivifying force to pass into the organic forms. In demonstration, that these regions abound in the greatest fulness of life, how many hecatombs of fat oxen, in ancient times, from volcanic Sicily, the Sicilian Isles, graced the altars of the Romans? The richest blood the armigerous gods of these people ever drank came from these districts—the very blood, to the virtue of which, they stupidly attributed their conquest and overthrow of Jerusalem—an event which had long been foretold by the prophets of Israel as the decree of Heaven. Sicily, we know, was one of the great granaries of Rome, whose soil, Pliny has said, rewards “the laborer an hundred fold,” and the flowers of whose shrubs, according to Diodorus, are so pungently fragrant, that dogs hunting “lose the scent of the game.” We know the most aromatic shrubs, beautiful, high-scented flowers, the choicest fruits in the world, grow in such districts. The richest, finest wines, seem to derive the very warmth, with which they inspire us, from the bosom of the volcanic fire.

Some philosophers love to regard volcanoes as nature’s great engines, by which she throws out upon the surface again the organizable matters which become uselessly buried in the bottom of the seas, and depths of the earth. Thus, by restoring the indispensable materials which get beyond the reach of organization in geological changes, she sustains the equilibrium of her living economy.

The tendency of most all chemical bodies is to crystallization under suitable circumstances. Were there no obstacle in our world to oppose or react upon this crystallizing attraction, a larger portion of the alible matters might become durably fixed in rocks, and other mineral masses; thus get beyond the reach of life, become permanently azootic, and the economy suffer. The internal fire of the nucleus of the globe radiates constantly to the circumference. The severest colds of winter repel it but a short distance below the surface, as is manifest from the steady temperature of most of foun-

tain waters. This fire offers a movement of expansion continually to all bodies. The local volcanic fire, therefore, may co-operate with this fire of the nucleus in opposing general solidification; and exert a recuperative movement, as before noticed, on the organic kingdom, not only by the exhumation of the materials or means, but by preserving them chemically within the living domains.

Inquirers have endeavoured to determine, whether the number of volcanoes is increasing, or their tendency is to extinction. If the Muse interpret Pythagoras right—

Nec quæ sulfureis ardet fornacibus Ætna

Ignea semper erit, neque enim fuit ignea semper,

he did not believe volcanoes have been always burning, or that they will continue to burn always. Sniadecki before cited, contemplating the highly combustible character of all organic bodies, made them the sole origin of volcanoes. Life, therefore, being the only cause of all volcanic excitement to the earth, her mountains were not shaken or her seas convulsed by fire, until long after the creation; or until such bodies had time to accumulate in masses sufficient to undergo spontaneous decomposition. These bodies essentially volcaniferous, and nature's means of future animation, got in the depths below, are raised to the surface by their own ignific strength. Thus, by this beautiful law, read out in clouds, and smoke, and upheaving thunder, she restores the equilibrium to her great life through all duration.

With him accordingly, the greater or less intensity of the excitement of volcanoes, must mark the exacerbative activity of the universal life, since its spoils are their feeders; or they are natural *biometers*. Contrarily to Pythagoras, then they can never cease burning while there is life to supply the fuel of their flames.

The frequency and intensity of submarine volcanic excitements, where the debris of organic bodies must be accumulated in the greatest abundance, yield some faint support to this specious, but too exclusive hypothesis. His words, according to the translation of MM. Ballard and Dessaix, which I quote for their fine spirit, are—"Ces élémens de matière viable, ensevelis dans les entrailles du globe,

reparaissent alors à sa surface, avec la puissance imprescriptible de repasser par la série des êtres organisés, et de recommencer de nouveau la vie. C'est ainsi que des magasins immenses de cette matière, que la nature retenait, depuis des siècles, captive dans ses abîmes, et qui semblait avoir perdu à jamais la possibilité de retourner à l'organisation et à la vie, profite de sa délivrance, pour s'élancer dans son ancienne carrière. Les volcans sont donc les grands moyens qu'emploie la nature, pour parvenir à cette fin sublime. Nous voyons par là combien est grande leur utilité dans la composition universelle du globe terrestre; et combien importantes leurs fonctions dans l'équilibre général.—Sans l'existence des êtres organiques," he continues, "les volcans n'eussent jamais existé; ils n'ont dû paraître que très-tard après la création du monde. Sans les volcans, cette quantité énorme de matière viable, accumulée chaque jour dans profondeurs du globe, et n'ayant aucun moyen de retour à la surface, eut été, à jamais, perdue pour l'organisation et pour la vie. Ces pertes se répétant journellement et sans être jamais réparées, le nombre des êtres organiques se fut diminué dans la même proportion, et eut fini par périr et disparaître."*

4. *Too great development of life in one part of the living series strikes, with proportional destruction another part in various ways.*

The simple place which a plant occupies obviously prevents another from growing there. Every living being, according to De Candolle, contends with its fellow for the means of subsistence. A species of grass of higher nutritible powers, and more hardy, introduced into a meadow, will perish out the indigenous races, and take possession of the soil. If the same care and labor, which are bestowed on the meat and milk-bearing species, were lavished in rearing the Carnivora, man himself, in the wild havoc, would fall a prey to their predacious ferocity. The appetites of plants and animals, however, upon a general view of the subject, appear to be wonderfully modified, to accommodate the di-

* 'Theorie des êtres organisés, supra citato, p. 133.

versity of the alimentary substances, that they may not be in one another's way in this respect.

There seems to exist a sort of equilibrium in the great living chain, which is essential to the good of the whole ; and which nature has obviously labored to secure and maintain. We must, however, suppose this equilibrium is extremely delicate, since this chain, enormous as it is, vibrates easily and quickly. Among other causes, it would appear, human agency sometimes disturbs its balance.

5. *Human agency*.—We read in a reputable author, it became fashionable some years since among the Russian ladies to ornament their dresses with the beautiful tuft of feathers which grew on the head of one of the native species of birds: The scalps of these birds in their markets became in great demand ; and the birds were eagerly sought for, and killed up. Soon their grain crops were attacked, and destroyed by an insect which had multiplied prodigiously. A frightful famine ensued, and many thousands starved with hunger. It was soon discovered, this insect, which through famine had destroyed so many human lives, was the food of the little creatures they had hunted out of the empire ; and to their absence its multiplication had been due. The interference of the government replaced this insectivorous bird, and all went on right as before.

6. *Insect life*.—In countries where the climate is warm, and the soil productive, the hygrometrical states of the atmosphere being favourable, an enormous amount of foliage and fruit is produced. The instantaneous explosion of insect life is notorious. The invading locusts,* caterpillars appear.

* Histories and travels are full, and marvellous concerning locusts. Green Cyrenaica in Africa has often been devoured by them. St. Augustin mentions a locust plague in that country, which destroyed in Masinissa alone 800,000 persons, besides many more in the districts near the sea. In 591, an army of locusts from Africa ravaged Italy, and were thrown into the sea, where they produced a pestilence, which carried off nearly a million of men and beasts.

The Venetian territory, 1478, visited by locusts, lost 30,000 persons by the famine they occasioned. Their devastations have been great in France,

The crops and all the green covering of the earth are devastated for many thousand square miles. The whole country is a creeping, flying sea of life. The herbivorous races starve and die. Their work done the destroyers die too. The burning rays of the sun pour down unobstructed. Foul, febrific contagion goes up to heaven; and the epidemic meteoration scatters with the winds—

Macies, et nova februm terris incubuit cohors:

Famine presses; the snaky Furies of death leap out of the horrible, putrefactive mass. The people know not where to fly for refuge in the poisoned earth. Wherever they attempt to escape, they die by thousands; and, with insatiable fury and madness, death continues to rage long in countries far distant from the scene of the first desolation.

7. *Other causes.*—Paludal exhalations, or exhalations from the decomposition of vegeto-animal matters, and idio-miasma, among external causes, appear to be the most active in fixing the rates of accidental death in our world. The epizootic meteoration, to which occasionally so many birds and quadrupeds fall victims, must be regarded as having an origin similar to that of the paludal or marsh miasma, differing, perhaps, only in the ratio of atomic combination.* Wherever, therefore, the just proportions between the living series are lost, or the equilibrium of the great living whole interrupted, as in the plethora of insect vitality above, the natural causes of death are prodigiously augmented; hideous famine, murderous pestilence will be born; and the

Germany, Spain, Italy. To Poland, Russia, Hungary, Arabia, India, and some other countries, their return has been periodical. In Poland, Russia, Lithuania, it is reported, their bodies were heaped in some places to four feet deep. Barrow, in his travels, says, when they were driven into the sea by the wind from Southern Africa, “they formed along the shore for fifty miles a bank three or four feet high.”

* We know a single atom, more or less, in chemical compounds, alters greatly their medicinal as their physical properties. Calomel and corrosive sublimate, for example, differ much, yet the one possesses only a single atom of chlorine more than the other, to which this difference must be due.

equilibrium will not be restored without great loss in the different members of this series.

8. *The sun*.—We may suppose, if I may so speak, the sun in traversing the circular ecliptic, arrived at different points, vibrates more or less this delicate equilibrium. The ancient fathers of nations, in one of these points, placed monitively the Scorpion with his poisonous sting. We know the countries on which the sun lavishes most of his rays, as on the shores of Africa, on either side the Levant, have always been the hot-beds, the *canabula* of the plagues which have so repeatedly scourged the world. The sun's action is principally by atmospheric meteoration.—The sea-life, mostly hid from observation, no doubt, is subject to similar exacerbative movements.

9. *General reflections*.—The poets, we know, had the honor of being the first historians of nature. Animated, spiritualized by the charm and brilliancy of their ancient theology, they bestowed on the earth, then the abode of both gods and men, the greatest fecundity; covered it with the most delightful climate of unvarying temperature; and deluged it with savory fruits and flowers. The main ambition of their Muse was to embellish the reign and glory of Chronos, in doing which, they filled the world with classical fragrance and sweetness, a living harmony it can never lose.

These same poets speak of wild herbs, acorns, berries and such fruits, the earliest products of the earth, as being the food of the first men; and of their battles, as fought with clubs.

Nec ullis

Saucia vomeris, per se dabat omnia tellus :

Contentique cibus nullo cogente creatis,

Arbuteos fœtus, montanaque fraga legebant

Cornaque, et in duris hærentia mora rubetis,

Et, quæ deciderant patula Jovis arbore, glandes.*

Now since, from long experience, the native soil of any country not subject to delatation or any of the like local, renovating causes, does not grow any deeper, but remains

* Ovid, lib. i. p. 102, *Metamor.*

always pretty much the same,* we may not suppose the earth was any more fertile in the olden annals or age of Saturn, than at the present; or the fruits it bore, any more delicious and nutritive. Few of them are adapted to human subsistence. Most all have derived their flavors and nutritive properties from the transforming agency of man. By diligent cultivation the sloe has become the plumb; the crab, the orchard apple; the green, bitter *Brassica Oleracea*, the white-headed cabbage. We know not what changes cultivation has wrought on our Indian corn, and the other cerealia. The native country even of but few of them is known; for wheat and barley, modern conjecture is simply in favor of Palestine.

Since, therefore, fecundity is subordinate to food, we cannot suppose those nations who sat down to feast at tables

* When I first explored, some years since, just as the Indians were retiring, Western Georgia, where I now reside, I was struck with the great variety of native soil untouched by the plough. In some plains, and on top of some hills, it was rich; in other places, the same descriptions of surface, poor. The whole country was enveloped in a thick covering of luxuriant grass, and overspread with towering forest trees.

Here, I reflected, are fair examples of nature's method of creating and preserving soils. Here annually is deposited a dense layer of vegetable matters—has been deposited with animal remains from all antiquity. Why has this soil remained stationary; or rather, from these continued decompositions, why has it not grown to an impenetrable depth?

We know, on analysis, vegetable substances yield hydrogen, oxygen and carbon. Two of these are the base of water; the other united with oxygen is a volatile gas absorbable by water. From their volatility and solubility—their active affinities,—they cannot be permanently fixed in soils; nor for the same reason, the more complex elements of animal bodies.

It is then contrary to the laws regulating soils from the zootic ruins, to augment them thus in perpetuo. Nay, it would seem, nature has a more valuable use for these precious materials; she gathers them up promptly when dispersed by death, and by successive reorganizations, keeps them continually active in her living economy.

It is, therefore, not probable the soil pressed by the huge feet of Hercules bearing his war-club, or the woodlands of ancient Greece and Italy, where the reign of Saturn threw the poets laureates of after ages into a sea of tuneless pleasure, were more fertile than similar soils of our epoch; or the acorns, and other wild fruits they bore, more delicious and alimentary than the same fruits now on the living trees.

strewn with acorns, were populous; or those bands who warred with clubs, were mighty in numbers. And since knowledge and the civil arts create mainly the aliments* on which man subsists, and the invention and progress of these have been slow, we may regard the mighty armies, and battles we read in tradition, and early history, as more or less fabulous.

We know the aboriginal population of our frugiferous America, possessed of but a few rudimental arts, was very thin in relation to territory, as I have already noticed; and making just allowance for the decided superiority of some of the races, we have no reason to believe the nomades, who first wandered over Asia and Europe, excelled them in this respect. But that man in his numbers principally subsists by his own resources, needs no proof.

The same restraints, which hinder the augmentation, and expansion of our own species, do not apply with equal force to any other of the orders of life. Every green leaf, blade of grass or fruit, is a festival board to myriads of them. Many of them, furious in the movement of their generations, rich in the means of emigration, with the supply of food, themselves not becoming food, might, at an early hour after creation, have overspread and taken possession of all the appropriate borders of the earth. Even with all the impediments, we may suppose, many of the living species soon reached the limits of possible extension. And the number of these in the most ancient times, may be considered as equaling or excelling the number existing at the actual time.

But man—unlike these species—tedious in his uterine life; uniparous; slow in his metamorphosis to manhood and fecundity; slow in his changes to the hollow features, and the gaunt form to which natural death only has titles; cooking, machinating, the means of alimentation mainly in himself—must evolve slowly; and his population in antiquity, be in great disproportion to the recent annals.

* On the relation of food to arts and industry, forbid to us, the labors of Smith, Malthus, Ganilh, Stewart, Storch, Ricardo, Sismondi, Say—have expanded much precious light.

La Mark, however, and his school could find no difficulty in crediting tradition in the myriads of men, who inhabited the ancient earth. For, since they find our primitive model, the *ferus homo*, in one of the *Quadrumani*,* which feed from the hands of nature like other beasts, they could have multiplied without the restraints that attach to us. But this animal, the gradual mutations of which to humanity La Mark has so patiently, talentedly, described, is shown by W. Lawrence and other zoologists not to be the painstaking plodding creature of our species. Though faintly imitated in these animals, the modern labors of comparative anatomists abundantly evidence, that our humanity organic, intellectual, and moral, occupies a place alone by itself in nature. The world has repeatedly shown, that great erudition and talents can bow submissively, and pay homage to the silly idolatry of empty hypothesis.

From the varied manner of reproduction, the modified perfection of emigrating power, and other causes, it is reasonable the different species would reach the maximum of the possible population the earth would support, at periods of time more or less separated from one another. No time being necessary to be consumed in developing their instincts, and creating the means of support, each species, in an order proper to it, would reach this maximum in a period vastly shorter than would be possible for our own. Man born to dominion disputes with nature every inch of ground his population is permitted to occupy; and his numbers increase nearly in proportion, *cæteris paribus*, to the ratio, in which he brings forth the rich treasures of his genius.

Ancient Britain, and the countries of Europe, for instance, subsisted almost entirely on the produce of their own soil. But how many millions in commercial England, and the

* Dr. A. Clarke, Commentaries on the Bible, regards one of these *Quadrumani* as the very serpent which was instrumental in bringing "death into our world with loss of Eden, and all our wo." If, therefore, La Mark be correct, it was only one of Eve's wicked brethren, who, by his cunning and artful eloquence, achieved her disobedience and foul seduction. *Philosophia audax!*

European states, now live on the bread of foreign lands, their improved knowledge enables them to create. And, since knowledge is now more abundant and varied than at any past time of history; and since much land washed by different seas, and a new world have been discovered, we should think the number of our race in the actual annals is much superior to that of all former periods.

From the tardiness of our inventive powers, to which alimentation is subordinate, offering as it does, an obstacle to our multiplication like other creatures, it is probable for a long time the nations immediately descended from the first parents did not occupy much territory very distant from Eden. And, for the same reason, after the deluge, much time was consumed before they became numerous in the accessible parts of the earth. That man at first increased slowly, and brutes rapidly, is proven from the fact that all the venerable monuments, and ancient traditions, which have been preserved, are full in strange accounts of giants, monsters, huge serpents as Typhon, and other savage colossal forms of life, which overran all countries. The wars which men and gods waged against these furious homicidal beasts, caused the first lyre to be strung; and the exploits of heroism which overcame them, next to cosmogony, constituted the most brilliant materials of the ancient song.

But to conclude these reflections.—It is clear from what has been advanced—in the destruction of inhabited lands by volcanoes, earthquakes, inundations, and other exterminating causes, and in the redemption and renovation of inhabitable soils, the great action of the vivifying force is subjected to occasional contractions, and expansions, or quick vibrations;—that nature is conducting her numerous progeny through varied fortunes, and perilous vicissitudes;—and, that while all the inferior races may have long since reached the utmost fulness of their life, man may yet still definitely increase.

SECTION IV.

HYPOTHESIS OF THE REVIVESCENCE AND INDEFINITE DURATION OF THE ORGANIC, PLASTIC NATURE IN US.

THE spring of mental activity resides manifestly in the organism. The nature in us which feels, knows, and the nature which so artfully organizes, and keeps the body in motion, exist, in the actual order, in indissoluble union. The efforts of the one never take place in the absence of the other. Why, then, have philosophers supposed, any events of futurity will necessitate the disseverment of this union; that this original order of creation will ever be changed, and all the conditions of activity be concentrated in the mind? or why have they vindicated the immortality of the one, and not that of the other?

Since neither that which lives nor which thinks is of tangible form, reason sees nothing in the one more than the other to insure duration, yet the separate immortality of the soul is of ancient faith. Death, which is an evanescent phenomenon not properly profounded, has, probably, been the cause of this partiality or preference that has been given to the mind. I will offer here some considerations in favor of an equal immortality for the cause which organizes the body and keeps in play the functions—for the nature essentially vital in us.

We know not where nature will end her long and toilsome course; or whether the changes she is hereafter to experience will be greater and more eventful than those through which she has already passed:—Or we know not Creative Power producing, supporting, or remodeling the physical laws. Yet we are certain from revealed testimony our species have every thing at concern—will be altogether interested in the events of an indefinite futurity.

Besides our own sacred books, the chronicles of all ancient nations—the Puranas, the prophecies, and sacred pæans of Vishnu, the Zendavesta, the discourses of the Edda, the songs of the Voluspa, all speak of a future fiery cataclysm;

fractus illabitur terrarum orbis, of the gliding away of the broken orb of the world; when the extinguished generations of men will ascend on “camels of snowy wings” to the Paradise of the virgins of dark-flowing locks; to the pleasant shade of the oak of “never-failing verdure;” to the pure “garden of delicious ideas;” to the blissful, bowery fields of Elysium; to the city of Midgard or of friendship, the joy of woman’s immortal beauty; to “the Halls of festival pleasure above,” where echo the voices of love; to the celestial city of the pure and just, of “*the blood-washed throng*,” or go to the “scorching South;” to “the Lake” of fierce raging flames, of spiteful serpents; to the gloomy, sultry plains of “burning Tartarus;”—O beautiful, rising idea of Christianity! fair, transcendent above them all!—“*blood-washed throng*”—purified from the dross of the world for the love, union of God; lead me where thy waters flow pure infinitely above Helicon’s sung by Grecian Muse, known only to the harps of Zion; conduct me to Him, who made me in love, in love receives me from the tomb!

This idea of the future distress and calamity of our world, of impending destiny, is written ineffaceably in the heart of man; he thinks of it, wears it always in his bosom. In whatever country or age you examine him, you will find it inscribed in his hieroglyphics; written on his tombstones; columns, obelisks, statues, pillars, temples—left in the records he has made. His immortality in disproportion to him here, seeks utterance, marks its compendious image on the shadowy forms of matter which surround him; and seems to wait impatiently for the immensity in which it is to plunge.

Before drawing on the resources of reason, I may submit the argument, and declaration of Divine philosophy.

Ἀφρον οὐ ὁ σπείρεις, οὐ ζωοποιεῖται, εἰ μὴ ἀποθάνῃ. Καὶ ὁ σπείρεις, οὐ το σῶμα το γεννησομενον σπείρεις ἀλλὰ γυμνον χόλον,—Σπείρεται σῶμα ψυχικον, εἰργεταὶ σῶμα ὠνευματικόν.*

In this untombing or general exhumation of our race, and transition from one to the other life, from the anatomical

* Corinthians, chapter xv.

elements of the animal body death destroyed, an organic, spiritual body is evolved.

1. *σῶμα*, corruptus, corpus, from *corrumpo*, I break—susceptible of breaking—frangibility, the general mode of existence to all the forms of matter, is the idea, par excellence of body. *ψυχικόν animale*, *anima*, *animus*, *ψυχῇ*, *ψυχῶ*, I breathe—respiratory, is the general mode of existence to all lives. By the laws of nature, the forms of all matter, as just intimated, both mineral and organic, are destructible, more or less evanescent; but their elements remain permanent, and incapable of change. All organic bodies live only through their intercourse with the atmosphere, by continual respiration or vital oxydation; this process suspended, they die. Consequently, the universal destructibility of bodies, and the oxydizement by respiration of all that live—essence of animality—constitute the radical ideas, the net conception of the *σῶμα ψυχικόν*.

It is this *σῶμα ψυχικόν**—this breathing, frangible, corruptible form of matter, animal, “*natural*,” body, as in our translation, which is sown or deposited in the tomb as the grain in the ground; and which, by the operation of new laws, I know not that I may say of nature, becomes, and is raised a spiritual body in imitation of the stalk from the dead grain.

2. *Animal body*. In the actual order of the world, I have shown in a preceding part of this work, that the organs of all lives are evolved in strict and unalterable relation to the properties, qualities and habitudes of the external forms of matter, which constitutes inhabiteness. In its renovation this body is no longer *ψυχικόν* or animal. It has lost its ties, its adaptations to these external, material forms, which made it *animal*. The sources of its vitality are no longer in them; their rapid movements through space—the exertion of their

* At the time of the translation of our Scriptures, the medical philosophers divided all bodies into two classes, *natural* and *nonnatural*. Hence we may suppose this word, which means *animal*, was translated *natural*. *Natural* applies now equally to all kinds of bodies; *animal*, to only a certain class. From this change of nomenclature or language, this translation will be apt to be misunderstood by the common reader.

active forces could stir no life in it now. The respiratory, food-taking, frangible body, which died, is changed in the renovation into a "*spiritual body*." The mechanism of its vitality is changed. This body looks out beyond the forms of matter for alimentation. They have grown useless; and after having out-endured, all our ages perish too. Lost all equilibrium, their imponderable agents rage in ignipotency; their attractions prostrate, and they struggle hard in their great death.

3. *σῶμα πνευματικόν*. This is the body of the new life. Body as we have seen, which means the corruptible or destructible forms of matter, when applied to the forms or constitutions of any other sort of being, would carry with it the essential idea of their destroyable nature. The inspired author arrests this idea in the expression, "this corruptible," (meaning body,) "must put on incorruption"—a state not to be broken to pieces. The organic elements of this body, therefore, unlike all the living bodies of nature being immovably fixed, it is immortal. I have already shown these elements in our present bodies will not remain in fixed situation, and that death occurs through the failure and overthrow of the living, chimifying force incompetent to immortality.

πνευματικόν—*spiritalē*—*spiritus*—*πνεῦμα*—*πνεῶ*, I breathe. These elements, as I may say, are permanently *breathed*, nutrified—are vital per se. They live naturally, or live of themselves; and differ precisely from those of our bodies now, which obtain life only by assimilation, respiration, and numerous other functions, which the connection of our lives with matter necessitates, and which may be considered as only an affair of our world. This life, like the body, is, can but be immortal.

The parallel between the two bodies and lives commencing *Ἀφρον*, O thou insane, simpleton! is between the sowing and vegetation of grain. If the grain do not die, the future stalk and ear will not appear. But these are not the grain itself which was sowed; they have only sprung from it. Like the sowed grain, from our entombed bodies, new ones will come forth, which will not be they themselves. But they

are sequences the one of the other, since, if the grain does not die, it is not "quickened."

The radical words $\psi\upsilon\chi\omega$ and $\sigma\upsilon\epsilon\omega$, which characterize the two lives, we have seen, both convey the same idea of breath or breathing. It is the *respirationis entitas*, living fire, which the words likewise mean, bestowed on us by Divine Creation, which organizes our bodies here—makes the corruptible matter of the world live in them, that will enjoy life hereafter united with bodies modeled after its own nature. It is the imperishable breath of the Almighty pushing man through his generations, over the gulf of death, and landing him *good* in his own eternal sojourn.

Naturally immortal, this nature essentially vital in us, which is transmitted in generation, which bows in obedience to the revolutions of matter, vibrates rapidly and quickly from its adverse influences, quiets in the tomb, will one day, the soul united with it being pure, mount over the broken orb of the world to unchangeable tranquillity and fulness.

CHAPTER IX.

MIND.

THE branch of natural history, which the mind forms, has been cultivated with the greatest ardor and interest since the early annals of philosophy and science. Seen in the light of time, none exhibits a greater diversity of discordant phases. It would appear, the mind in studying itself has been more doubtful, as to the true nature of its own phenomena than of those of any other being in nature. Its ability to profound itself appears every way limited. This we may conceive to arise from the infinite relations it sustains with the universe, the complete philosophy of which, beyond its resources, would be necessary to the full comprehension of its own. In this universe it is only, simply a

part of a great system of forces of reciprocal action, to which its phenomena are due.

In the preceding chapters of this book, we have contemplated some of these relations, forces, which are nearest home, and which exert the most direct and energetic influence in the causation of its phenomena. Thus, in our manner of study, its subject properly falls here to discussion.

To mention none of the changes or history of the science, recorded in a thousand works, at the actual time, it is the fashion of a host of philosophers to look on all the mental phenomena as simply the acts of the encephalon. Such acts only stimulate to such phenomena, or are the conditions.

SECTION I.

MIND, INCONSCIOUS OF THE VITAL ACTS, ITS IMPELLING FORCES, AND
DISTINCT.

THE power, which evolves the embryo, impresses on it the human shape, unfolds the organs gradually to manhood, conducts them through the series of changes to decay and death—the power, which decomposes aliment, occasions its absorption, distributes it through the nutritive apparatus it has formed to all the capillary system, undoes the organs, and finally achieves its assimilation to their structures preserving their specific forms, cannot be the power in me, which feels, thinks, wills, judges, and reasons.

I am entirely conscious that I feel, think, will ; but not that the blood is circulating through my body, the substance of its organs is removing and replacing. The motions of secretion, absorption, exhalation—the acts of the *Nisus Formativus*, which drew out from the germ the human form divine, first moulded the tissues, combined them into organs, further combined them into apparatuses and systems, gave them separate forces, united them for special functions, united them further still into one great reciprocal movement, conducts in, presides over all their changes, strike not our intelligence. The great and multiform labors of this *Nisus*,

as Blumenbach delights to call it, are achieved in the complete absence of the moi; and must be separate and distinct from it in its being. Before even the operative existence of the moi, it labors, prepares for it in the maternal womb, the evolutionary and active theatre.

Nay, so far from the moi or mind being conscious of the acts of the plastic agent, it has now for several thousand years been steadily looking with astonishment—has spent these laborious years in examining the labors of this agent, and contrived myriads of pleasing, illusory theories, to satisfy itself of the manner of their achievement. These labors, which many philosophers will still identify as its own, remain hid from it; and must ever remain more or less so. The unparalleled advance of philosophical anatomy, since the age of Bordeu and Bichat just passing, proves the assertion.

The mind of itself is conscious of all its own acts; it is only conscious of other beings when impressed by their acts.—No other being of nature enjoys this high, sublime prerogative; this peculiarity identifies, characterizes it among all others. To confound, therefore, the vital and intellectual acts, or what is the same thing, not to distinguish between them, is to confound all language.

It is manifest, all the phenomena of the sensible universe originate in, appertain to three immovable, fundamental causes, or matter, life, and intelligence, whose forces are reciprocal. These phenomena, as we have noticed, are presented to us, as one unbroken whole; developed in one great consecutive action. If you separate this action or locate the phenomena, ontologism has become an anathema. The French physiological school have corrected the error of ontologism in medicine, but in respect to the mind, have fallen into the opposite error. Ontologism no doubt has been egregiously abused in all the speculative sciences. But has it not a real existence in nature? and ought it not to have in our philosophy, since we can distinguish the great active elements of her constitution. Although, therefore, the acts of the moi and plastic agent are presented to us united in one,

and we can see nothing to distinguish them, except that the moi is conscious of what it does, is it not for the interest of science, the distinction, which is so obvious, should be observed?

SECTION II.

WISDOM OF THE MIND IS IN ITSELF, AND DIFFERENT FROM THE WISDOM
MANIFESTED BY ALL THE OTHER EXISTENCES OF NATURE.

ALL beings anticipate futurity in the results of their acts, or are wise. They wear this wisdom as their exterior robe. On whatever part of the universe we look with attention, we can but observe it; it forces itself upon our observation, as if to keep us always in remembrance of the elder, Parent Wisdom, from which all come, to which all tend.

In its operations, the vital agent evinces prescience, and the most consummate adroitness. It keeps the torrent of ages flowing by detaching life from life. It derives the organic materials from the variety of external bodies; its first labor is to reduce them to a homogeneous mass. Afterwards it hollows out from this mass the cylindrical tubes; moulds the solid bones; fabricates a variety of tissues, and bestows upon them specific forms and properties—the elements of animality. Some of these forms and properties, all especially originated, it combines to oppose the innate forces of matter, direct them into new channels of action, or unite with those of its own economy. Others it groups to labor at home, or be employed in the immediate concerns of this economy. Finally, it combines all the special organs and functions into one great, reciprocal movement or function, which completes the design of animality—a *divine idea*.

This body and movement—truly a microcosm—thus formed, exists in nature a separate order of being. It is, as I have just represented, the work of the organizing agent, one of the great elementary, triple forces of the world, the attribute of creation. For the wisdom and skill it evinces simply in cicatrizing wounds, knitting together broken bones,

arresting mortal hemorrhage, cruel disease, and death, the fathers of medical antiquity erected it into a female divinity; and paid homage under the title of *Vis Medicatrix*.

The most excellent attributes of wisdom must undoubtedly belong to the work. But is the worker itself intelligent, skilful, prescient?—Does it feel, perceive its own acts; their relations, dependencies in causation—know what it does? If in the affirmative—the molecular forces impress on the bodies they evolve the same properties; on the crystals, the same modal forms: the attractions, which impel the stars in heaven, conduct them forever through the same unvarying series of results; and, for the same reason, must likewise be intelligent.

But the mind differs from these governing forces of life and matter. It is inclined too to travel through the same series of phenomena, as is obvious from the inspection of our sciences. But in any given period it will vary from the beaten track, is full of originality; and does not move through time the same unvarying quantity. It alone knows its own acts, measures out their proportions and dependencies,—is alone intelligent; and varies the direction of its movements and order of results. To this consciousness of what it does, and ability to direct its own efforts, are due all the sciences, and primarily all the arts.

If the organizing force, like the mind, enjoyed this consciousness—the wisdom, prescience it displays were original endowments—long since, it would have abandoned the monotony of the first formations, and presented new inventions of vitality. In shaping and compiling the materials for animation, it would have comprehended the proportions and dependencies of function on structure, the special and general uses of all the living parts; penetrated the original conceptions—theory—of the first formation; and set up models after its own order. For, if the vital force were so gifted, we see nothing in nature which offers absolute limits to either the forms or length of the living chain. And, if the ruling forces of matter were endowed, as we have supposed, they would have bestowed new properties, and new

crystalline forms on the bodies subject to their modifications, and conducted the oranodesic spheres through new routes in space.

Like the forms of organic and anorganic bodies—the forms of lives and of worlds—the sciences and arts of living men, were not of original creation. From a *tabula rasa* the mind has advanced in strength until it has brought them forth. They are new to the original creation, creatures which have truly sprung from it. It is by this precious faculty of knowing what it does, trusted to none other here, that it has founded itself a creator. The organizing force, from a *tabula rasa*, has not advanced, and established the forms of the actual living series, as some philosophers of ancient as of modern times have literally pretended to sustain. They needed—were fashioned at first by divine art, and placed on the route of generations, through which this force simply impels them. Nor from chaos did worlds spring; they were lifted from it into their orbits, in which the use of their forces is to sustain their motions.

The knowledge, wisdom—acts of intelligence—manifested by the formative and conservative forces of living bodies, of all material existences, can only be *impressions permanently made on their contrivance*, or the *acts* of creation continuing in them, while the mind is permitted to create for itself, which is its crowning distinction. It continually makes new efforts, engages in new enterprises, and modifies its products. All other existences remain, have always remained stationary in the perfection of their achievements; their perfection is unchangeable. In the fortunes of society, it continually advances or recedes from perfection. It enjoys peculiar relations with the Divine Being, is esteemed peculiar by Him; and, by the gift of knowing trusted to it, is commanded to gain knowledge; and make its way through the compages of the world, which immerses it to His paternal home.

The action of the external world and of the living organism, the transmitting medium, is indispensable to all its activity, and claims next to be considered.

CHAPTER X.

MECHANISM OF MENTAL ACTIVITY.

How do we perceive external objects?—what is it we perceive? Plato, with his illustrious master, and the philosophers descended from him, maintain, it is copies, pictures or images; *simulacra*, prototypes, divine patterns, after which all the material forms were modeled, which immediately excite sensation, and are the objects of perception. These *simulacra* primordial to the universe, through which God beholds all things at once, as present, and existing in himself, are immortal and unchangeable, and the causes of all knowledge and science to us. Being the true, and faithful resemblances of all the material forms of the world and alone perceptible, the mind's perceptions of them, therefore, must ever correspond, harmonize as much as if these forms were directly perceived.

Maddened by contemplations of theocracy, the morbidly spiritual Malebranche, and his sect, too gross and voluminous, could see in nature nothing but the movements and displays of theocratical power. They could but behold all external objects, as instruments in the hands of the omnipotent Creator, with which he stimulates the senses, when he desires to communicate to the mind such ideas and perceptions as are suitable and proper for it. Thus He becomes the visual theatre, or a sort of demiurgic mirror, in which we see all things. “Il est absolument nécessaire,” says Malebranche, “que Dieu ait en lui-même les idées de tous les êtres qu’il a créés, puisque autrement il n’aurait pas pu les produire; et qu’ainsi il voit tous ces êtres en considérant les perfections qu’il renferme auxquels ils ont rapport,—il est certain que l’esprit peut voir ce qu’il y a dans Dieu, qui représente les êtres créés—peut voir en Dieu les ouvrages de Dieu.”*—The prototypic *simulacra* of all the in-

* Recherches de la vérité—tom. ii, p. 96. See this whole passage, and argument.

dividual things in the universe existent always in the Divine mind—the *simulacra* of Plato, it is plain, are what God communicates to the mind in sensation in the Malebranchian view, and which communicated constitute the mind's seeing of all things in Him. There exists but a shadow between the two hypotheses; they are virtually the same.

Contrarily to these views of the mechanism of the mental phenomena, Dr. Reid, ambitious, and occupying one of the most respectable chairs then in all Europe, and, too, when much light had just been expanded on all the sciences from the flambeau Bacon had held up, boldly elevated himself. He struck at Plato, and all the luxuriant scions* which had sprung from his maternal or radical idea. He took the only ground of originality then unoccupied, to which, however, Prof. T. Brown, who ultimately succeeded him in the same chair, disputed his titles.†

He taught in general terms;—*It is the external objects themselves, the mind directly perceives through the senses.*

In support of his new views, he passionately invoked the *common sense* of mankind. He erected this sense into a *vis regulans*; and, in his zeal and devotion to it, if not entirely successful, fell not very far short of its actual apotheosis. His friends paid prompt homage‡ to the Deule of which he had just broken the laboring shell. His critics and adversaries sat in judgment upon him; denied the existence of a sense common to mankind; and challenged him for proof.§ All the illiterate adopt him; the learned are divided. “I do not,” says Dr. Good|| quaintly, alluding to this *common sense* theory, “like these northern lights;” meaning to illustrate by the temporary flashings of the Aurora Borealis.

Dr. Reid's views, it may be considered, were suggested by the then recent history of the mind. The Schoolmen had made of its study a system of subtleties; and carried it

* Vid. *Essays on the Powers of the Human Mind*, vol. i.—passim.

† In his *Lectures on the Philosophy of the Human Mind*.

‡ Vid. Oswald's *Appeal to Common Sense* in behalf of Religion.

§ Vid. Priestley's *Examination of Reid, Beattie and Oswald*.

|| In his *Book of Nature*.

beyond the visible limits of the world. He threw himself into the opposite scale or extreme, and became their antipode, with the hope, we may suppose, of bringing it back whence they had displaced it, or to its right place. To present, however, the curious monuments of metaphysics, time has spared; explore the labyrinth of opinions, and the causes, which led to their espousal, I have said, is not ours. We may say, with some exceptions, since the age of Bacon and Descartes, views of this sort, as of all others, have been improving; and, could light have sprung from pure abstractions, the toil of fancy, isolated contemplations on the agent itself of thought, psychology had been equal or in the advance of the other sciences. But it was needful it should wait until knowledge broke on the immediate conditions, the acts of the living structure, which subordinates its phenomena.

We may never know the union of mind, life and matter, the three reciprocal, great, fundamental forces of our world—know the manner of perception, or what it is we perceive in external objects; or whether the celebrated error of Spinoza, Leibnitz, Kant, Plato, Reid, Berkeley or the Malebranchian fable be true history. But we know the mind does not perceive external objects until they first impress our senses. If, therefore, all motion were suspended in matter, and the organism and mind could remain untouched, during the suspension, we should continue perfectly insensible, unconscious of all such objects, although in our very presence.

1. The action itself, then, of all external bodies is indispensable to their perception; and their continual perceptibility, while in the intercourse of our senses, is proof that they exist in unremitting activity.

During *bouleversemens*—asphyxia—syncopation—when the action of the organism is more or less completely suspended, the mind is perfectly insensible to all external objects.*

* Twenty years ago now, I attended an adult patient attacked violently with the autumnal, bilious fever then raging. The paroxysms observed the

2. The action, then, likewise of the organism is indispensable to all perception; and all progressive perception, as the succession of all mental phenomena, is evidence, that this organism remains in continued effort during the manifestation of such perception, and phenomena.—Or, in other words, there exists no immediate union between the mind and material universe, the actions of bodies alone not being competent to cause consciousness in us.

most exact periodicity. The patient plethoric, the most active antiphlogistic treatment was urged, without even abating the violence of the symptoms. About the termination of the fourth paroxysm on the fourth day, the fever abating, his forces gave way rapidly, and he appeared to die in a cold and viscid perspiration. There was nothing peculiar in the time, or manner of his death, for many went this year with precisely all the same symptoms to “the narrow house.”

He was shrouded, 6 o’clock, P. M., and the funeral appointed for the next day. Mournfully meditating the *ars medicinæ falax*, and deeply mortified, that death should snatch his victim, among the first, from my youthful efforts, I threw myself down exhausted to taste sleep in the next chamber. I had just read Bichat on Life and Death, and was arranging the order of the mortal symptoms, I had just witnessed, when I remembered, on shrouding two hours after death, his feet being raised, his whole body was raised up nearly in a straight line. His body, limber at first, had become rigid a little too soon for the coldness of the season, and length of time he had expired.

After all was still, I approached; imposed silence on the friends, who watched; took off the shroud, and the two pieces of silver coin, which had been laid on the eye-lids; made every examination; he was certainly dead. The body was icy cold; but the rigidity a little too early, might be suspected a vital phenomenon.—Warmth in every practicable manner; friction; diffusible stimuli in large doses mechanically introduced; artificial respiration, were administered during the night. At dawn of day, some symptoms of returning life; a little after sunrise, was perfect recovery; inanition 13 hours.

I interrogated him—he remembered to have seen others with myself about his bed, when a “dark shadow” came over him—had no consciousness of any thing afterwards till the hour of recovery.

But for similar cases in the history of medicine, I should be doubtful of recording this here, of which I have seen nothing similar since.

SECTION. I.

ACTION OF EXTERNAL BODIES, AN ELEMENT IN PERCEPTION, AND CAUSATION OF THE INTELLECTUAL PHENOMENA.

IN the actual advance of knowledge, it is impossible to appreciate this movement, or universal excitement in matter. Approximations, we may suppose, even very slight, have not been made. All philosophers, however, agree, that contact directly or by intervention, as the rays of light in vision, floating corpuscles in olfaction, atmospheric undulations in audition, are indispensable to the excitement of the nervous organ—to the continuance of this action on to perception.

The conditions which nature demands on the part of the vital economy, that this excitement existing always, and universally in matter, be received, transmitted, and become *perceptions, ideas, volitions*, is, as already intimated when treating of living mechanics, the soundness of the encephalon, the spinal marrow, and nerves. This soundness, therefore, and the actual presence, contact of matter with some part of the sentient periphery of the body or great nervous organ, are alone indispensable. The actions or sequences, which follow, are to us simple facts, taking place by an irreducible law, the secret of creation.

It belongs, however, to the genius of philosophy always discontented with its achievements, to supply all the phenomena of nature with causes, and connect them up smoothly in a regular series to her Great Original. Descartes began by demanding proof for every thing, pretending to doubt even his own existence—"Quin et illa etiam, de quibus dubitamus, utile erit habere pro falsis, ut clarò clariùs, quidnam certissimum et cognitu facillimum sit, inveniamus—Nunc itaque cùm tantùm veritati quærendæ incumbamus, dubitamus imprimis an ullæ res sensibiles aut imaginabiles existant."*—Some philosophers consider the general truths of the universe as hid from our eyes; admit a few things only as infallible, certain, and educe from them the reason of all

* Opera Philosophica, tom. i. p. 1.

others. By analogy Butler filled up the lacunæ of reason, and Fontenelle profounded the order of other worlds. By a solitary pre-existent, physical cause, the Polarists explain all the phenomena, and all the other causes of nature. Bacon sought to discover by observation; Aristotle, Locke, Condillac, from a single fact of the understanding, to infer all the other facts. Newton, whose great contemplations were always in contact with the unknowable, theorized by interrogation, and received the praise of modesty.

Let us do homage to theory! In the firmament of the mind, it is the Aurora, which rides front in the car of victory—of conquering knowledge. From age to age it has pulled up the old stakes, set them out further, and widened the boundaries. Its encouraging voice is, come hither, the ground is yours. In a moment, it has flung myriads of minds into new foci of activity; and new arts, sciences, have been born in a day, and new happiness for the species.

But has it done any thing here?—led us up on the ramparts of ancient science, and said “look over beyond.” Enterprising as it is on the field of matter, when it approaches this mysterious labyrinth, which exists between our intelligence and external bodies, it is powerless. The great shadow of the first night remains immovable; we know not our world, are unknown to ourselves; and from our reason, cannot tell whence we are coming, whither tending, or what may be our proportions with the great whole.

In the impossibility of knowing, there are some things, however, not absolutely beyond reasonable conjecture in respect to the action itself, which, when progressed, becomes sensations or perceptions.

ARTICLE I.

Manner in which the action is applied.

All living bodies are periodically withdrawn for a season from this changeless, exhaustless action of matter.—The cords, which bind them to the great material machine of the universe, are occasionally loosened; they sleep. The

points of the organism in immediate contact, on which this action plays—the senses—soon to be contemplated, with the other organs exhaust, deteriorate, wear out from their intercourse—they sleep continually—die.

This law, which necessitates sleep temporary and final, demonstrates the infinite disproportion between the force of our intelligence, of the living, manifesting mechanism, and this force of matter. What is this force of matter? Matter! what is it?—was when man was not, or life or Eden—first effort of creation; primordial base of all sublunar life, and thought—great in the space it occupies, and in its motion—magnificent, and beautiful in its forms—unworn, undecayed—extreme in age, young—grand in its spectacle, pushing on in eternal, unchangeable energy and activity—glorious in its radiating light—omnipresent in its gravitating attraction—sprung at first from an eternally wise and creative spirit, spiritual in its origin—planted burning flowers in the uplifted concave, the blue lawns of space, exhaling the aroma of light—worlds—lakes of snowy-flowing waters, cool grottos, shady walks?—resorts of the ancient-youthful Omnipotent?

In the sense of our mind, though it causes our perceptions, makes us know, it cannot be intelligent. But the Being who made it, is pure intelligence. Why, then, should philosophers have thought, he would make matter, any thing, *brute*, discrepant to his own perfections;—deprive them of the power, ornament of consciousness, by which alone they could feel him? Is it because they have not considered that the functions of our senses, as of the balance, are only temporary affairs of our world;* and because we can com-

* We do not know, that senses, a nervous tissue, are the only resources of consciousness, and but that all mute existences may possess a cryptopneumatic nature, by which they concur in the action of the sovereign spirit. Beyond all earthly vision, Isaiah addresses such a nature or sense—"Sing, O heavens, and rejoice, O earth!" "Clouds and darkness are round about Him"—"A fire goeth before Him"—"the earth saw and trembled"—are themes of the sacred lyre.—"Trembled at the presence of Him, who "made darkness his secret place; his pavilion round about Him were dark waters, and thick clouds of the skies."

Our divines make these expressions *prosopopias*. May they not be more?

pare things alone with ourselves, and not with him? But to proceed.

ARTICLE II.

Living parts on which the action is exercised.

All the vital structure is sequestered, withdrawn from this action, except the senses, which are anatomically nothing compared to the organic whole. By this law of organization, nature has reduced the ground on which this vehement action plays to an extremely narrow compass. From this fact, as well as from the necessity of sleep, we may likewise conclude, that the force impressing sensation is greatly exalted in energy and intensity over the vital and mental forces.

Nature, as I may say, seems to live in continual fear, and dread of this tyrannizing force. She manifests her solicitude not only by isolating all the organs except the senses, but also, by the rigid manner in which she enforces the laws of repose on all her living creatures. All vital and thinking energy exhausts quickly in this action. The soldier, after his long march, sleeps at the mouth of the enemies' artillery amid the tumult of battle; the seaman on the mast-top tossed by the roaring tempests. The conqueror thinking in sight of glory sleeps; the poet, in the presence of eternal fame, and its loud trumpets. The butterfly sleeps in the aromatic cells of flowers; flowers sleep drinking meridian light; the goat tasting the hibiscus; the infant, in smiles drawing the milk from the snowy urns of its mother.

Again—What is this great, incomprehensible power, activity of matter, of which all life is permitted to taste so sparingly? from which all creatures are so imperiously withdrawn in periodical slumber? whose being is preserved for a limited duration only by tasting, and then reposing? and, from which they are only finally freed by death, and the decomposition of their organic elements?—activity, without which, according to the great principle of Aristotle,*

* Nihil intellectu, quin priùs fuerit in sénsu.

Bacon, Locke, Condillac, we could have never known ourselves or nature—which paints on our mind the shadowy image of God and the universe, the latter forming the back ground of the picture?—Matter! original, empire force of the world, turns in its motion the index on the great dial-plate of time, time the evanescent speck between two eternities—washes forever infinite space with the sea of arrowy light it sheds—minister of the uncreated Spirit! brings from his fingers the sparks of fire, which light up in us the combustion of life, consciousness, sensation, and reflection!

We have just seen, the organs of sense are only directly impressed, and that the whole body, except the sensitive structure, is isolated from this action. The opinion was entertained both by the ancient and modern sages, that much of our ignorance, and slow progress of the sciences, is due to the limitedness of this contact, or to the fewness as to the imperfection of our senses. Every one knows that Voltaire made it the subject of his humor, the edge of which he intended for Fontenelle, the secretary of the French Academy.

Since each sense furnishes some new and distinct information of the phenomena of matter, it is inferable, that could our constitutions become more permeable to this action, or our senses with the power of the encephalon, be definitely augmented, our knowledge would expand in proportion. We then might profound the imponderable and other revolutionary attractions in bodies, solve those many mysteries occurring in the experimental sciences, which, through progressive ages, have remained forlorn hopes; distinguish between minds playing in flesh and blood, and those free in spiritual organizations, and draw nigher in thought to the first Being.

But it is probable, from the reflections on sleep above, could mortals attain to such enlargement, they could not sustain it. We have seen persons, who could scarcely live with the number of senses they had, for the tumults, torments of excessive sensation. There can remain no doubt, but our forces are accurately weighed, and librate exactly

against the great forces of the world. All the intelligence in the zoological scale is below ours. We may, therefore, infer, from the manner in which force is distributed throughout, and equipoises force in the system of nature, a greater degree of intelligence than in us is incompatible.

ARTICLE III.

Quality of the action.

Is the property, by which matter discharges the functions of its own system, the same by which it impels the plastic nature to organization, and the mind to intellection? From the simplicity of nature's manner of achievement, we may think it the same. But, the difficulty is not lessened, since we know not the proportions of these three elementary forces, whose displaying phenomena, I have said, is the sensible universe. We only know imperfectly the subordination of their efforts—that neither that which lives, nor which thinks, can begin and continue its own action within itself, while matter lives in the fulness of the movement it originates, and radiates the impulse, without which nor living nor intellectual existence were anything.

Gall and Spurzheim affirmed with reason sufficient to make proselytes, that the brain is formed by the union of the nerves; other anatomists, that the nerves are derived from the brain. Some of the learned make the mental phenomena the mind itself; others regard these phenomena as the labors of the mind. The chemists look upon the acids as having an affinity for the alkalies; but it may be the alkalies which have the affinity for the acids. We know not, likewise, the proportions of the three fundamental forces—of things among themselves. How limited our absolute knowledge! In how much darkness is veiled this action we consider!

May the movement, which stimulates to sensation be oscillatory? We know that all bodies are porous. Philosophers maintain the composing particles are enveloped in igneous atmospheres, or atmospheres of imponderable sub-

stance; and, since Newton, opticians know the rays of light are repelled before they quite reach their surfaces. If the particles are enveloped in elastic, igniform vapor, which fills up all their interstices, making all contact with one another impossible, we may suppose in their surfaces and volumes, they exist in continual oscillation. The repulsion of the incident rays before contact, favors the suspicion of such a formation and state. The manner, too, in which the extremities of the nervous organ terminate, the immediate recipients, is not unfavorable to be affected by vibratory motion. The peripheric, subcutaneous nerves expand into papillary points; the optic into retinal; the acoustatory and olfactive nerves expand; and the arrangement of the apparatuses of the two latter, is to accumulate and economize their respective stimuli, or vibrations of the atmosphere, and the atmosphere impregnated with corpuscles. We know likewise rough bodies are more tactile than smooth, and acute sounds more audible than dull.

But if the sentient extremities are favorable to be impressed by such motion, the nervous fillets, which are to conduct the impression to the brain, are any other than *vibrative*. A circumstance Hippocrates could not have known in forming his views; and unappreciated by Dr. Hartley, in erecting his celebrated *vibratuncular hypothesis*. And too, if vibrations made on the senses be all they require to discharge their functions, the picture on the retina is an anomalous, unmeaning superfluity, which cannot be.

Those *savans*, however, who see nothing but a primordial parent force, of which all visible existence is the mere development of activity, find no difficulty in exploring this mechanism. The imponderable agents form a part in the composition of all bodies. They are the prolific causes of all mutations. The brain elaborates them from the alimentary matters; the nerves form the media of all communication.

These imponderable agents—or light, caloric, the galvanic, magnetic, electric fluids, are bipolar. The bipolarity of light is evinced by some of its rays oxydizing silver, others deoxydizing; that of caloric is less manifest but certain; the double

mode of action of the other two is familiar. The tendency of all their movements is to contraction or expansion.

When, therefore, an external body is placed in contact with one or more of the senses, these imponderables display their activity in their attractions or repulsions of the nervous organ, which are sensations, consciousness, volitions. Every display is accompanied by some change in the state or proportions of the elements of organic chemistry—the phlogistic, nonphlogistic combination or decomposition of oxygen, azote, hydrogen, and carbon. Every mental phenomenon is achieved at the expense of some mutation in the substance of the living organs.

And we must suppose, from the laws of physics, according to this system, that all material bodies undergoing the operation of our perception, must suffer change too in their molecular constitutions. For, if they discharge in us the imponderable matters which they contain, changing the order of vital combination, the brain secretes abundantly these same matters armed with the same bipolar, modifying attractions, with which, in their turn, they must become surcharged. The mental phenomena being due to these matters secreted by the brain, as to those inherent in external bodies, and being simply the displays of their mutual attractions in the nervous organ, these bodies during sensation must be liable to a change in the quantity or proportion of these matters, or to a loss of equilibrium; and, consequently, to inevitable molecular alterations.

According to this view, in place of the “contraction of a muscular fibre,” had Darwin, immersed in the speculations of Brown, defined an idea *an attraction*, and identified the cause with the causes of all physical changes, he had now been the rival of Koenisberg and Schelling; and, with other noble worthies, stood on the cloud-capt summit of this transcendental philosophy. But we have no inclination to pursue farther, or profound this system, great in the names it can marshal.

Forlorn! Philosophers will endure the agonies, torments of thinking for glory, as if the lone discovery of truth was

not sufficient reward for their toils—truth, the true unity between man and his Divine Creator.

What have we precised? the contact of the objects of sensation, and the integrity of the nervous instrument.

SECTION II.

ACTION OF THE LIVING ORGANISM IN PERCEPTION, AND CAUSATION OF THE INTELLECTUAL PHENOMENA.

In approaching this impugnable subject for discussion, we seem to be climbing over the ruins of ancient times. These are the works of many successors—engines of offence—bulwarks, science has reared up since remote antiquity to hold out the siege, and force the secret truth of nature;—mouldering, broken—smoky images of thought; venerable, magnificent; but among them no trophies.

This action, according to M. Adelon, and majority of the physiologists, is triple.—1. The action of the sensitive organ, to which the sensation is referred;—2. Action of the intermediate nerve, which conducts the impression to the brain; 3. The action of the brain itself, the last material condition, which constitutes the impression a perception.

ARTICLE I.

Sensitive organs or the senses, and their action.

In the state, in which we appear designed to pass our days in nature, or in the healthy state, the senses proper furnish all the materials to the operative mind, which constitute its entire concern, or circumscribe its intercourse with the living body, and the external world. This state is the equilibrium of all the living with all the external, impelling forces—the calm between the organic and great mineral life of nature; the action all proportioned, regular. The great heart beats; the blood darts forward, all the atoms play in the living vortex, but the mind feels not “the idle whirl.” Enthroned above this busy scene of pulsations, assimilations, secretions, exhalations, it sits undisturbed. In

meditation free, it commands both the past and the future; wanders abroad; conscious glances at the Almighty; fashions the glittering rays of science; labors at the glittering woof of song; rejoices in its own strength and beauty.

But when this equilibrium is lost, or in the diseased state, the senses proper no longer furnish alone the elaborating materials. Each fibre, each bone—every tissue—may become vocal, and the seat to which the perceiving mind refers the impression—a sense.* The impressions of the living parts not sensitive, thus becoming senses, go to the brain, rival, triumph there over those coming from the senses proper, and command almost exclusively the mind's perceptive efforts.

These impressions appear to elevate the mind to the autocracy of the living body. In the eyes of some philosophers, they materialize its nature. Stahl seized upon them, and drew forth a victorious argument for the existence of his *Anima*. Their mechanism is most obscure.

Upon the view just presented, the senses may be divided into three separate classes.

1. Those, by whose action we know the organism in the healthy state.
2. Those, by which we know it in the pathological state.
3. Those, by which we become acquainted with the external world.

1. *Internal Senses.*

The senses called internal, furnish the mind with the intelligence of what passes in the living economy; or of the

* How infinite are the modifications of pain; how infinitely can disease multiply these senses!

Every experienced practitioner has seen patients laboring under fibrous, serous, neurotic,—irritations, when most every part of the body had become the seat of a separate torment. How pitiful are such sufferings! Too powerful for all other impressions, they engross wholly the sufferer's mind.

Thus it would appear, nature by such means, cuts off all mental intercourse with the external world, that the soul may witness the hard blows which break down the shelter which covers it here; and be apprised of the long and solitary voyage before it.

normal changes which happen there, as the external senses do those of the great outward world. But there is this very great and remarkable difference between the two. From the impressions made on the external senses, we deduce all the properties, qualities, and phenomena of material bodies as existing beyond the impressions, separate, and distinct from them and ourselves; while, from the impressions of the internal senses, we deduce nothing beyond. In the one case, through the impressions we perceive the causes of them, or external objects; in the other, through the impressions, we perceive, infer no causes. In the operations of these senses the living body remains in darkness. We do not see the organs, whose wants, natural conditions, they report to the mind. We see nothing colored, tangible, corporeal, through the impressions they make. It is simply the states or modifications of the nutritive portion of the nervous organ which we feel in their operations.

They differ likewise prodigiously in the spheres of their activities. The great external world circumscribes the action of the one; the domains of the living organs that of the other.

The internal senses, mostly periodical in their exercise, operate through health and disease; from time to time give notice to our intelligence of the return of our natural wants, as meats, drinks, exercise, repose, defecation.—Though active both in health and disease, they only manifest the natural or healthy wants. Hence I have included them here under the healthy state of the organism. Great labor, rest, sickness, health, promptly modify their activity—as the want of acids, and insatiable thirst for cool drinks in traumatic irritations, acute fevers; exaggeration, loss of appetite.

Their end evidently is to stimulate to volitions; but their stimulations would be unavailing, without the use of the external senses to direct to the objects of gratification. The two sorts of sense combine in the general, conservative action of the economy.

2. *Pathological senses.*

These are developed by all inflammations, by all deviations from the healthy state. They manifest activity under no other conditions—are strictly pathological. They are flambeaux lit up on the pathway to the tomb, to light us to its dark chamber—thorns over which we step, to reach the rest of nature.

These senses, operative only in disease, deserving this title, since the mind always refers the impression, except when the anatomical arrangement* of the nerves forbid, to the tissue or tissues affected, are not properly conservative. Or they do not furnish the mind with the idea of the proper curative remedy. It is true persons have dreamed of, most ardently desired, the very best therapeutic agent for their case. But practitioners know the sick most frequently think of, have an appetite for what would be injurious. These senses manifest to the mind simply the various modifications of pain, leaving it ignorant of the means of relief.

These with the internal senses appear to be developed, or their activity is manifested, by a law, which connects the operations of organic chemistry with the perceiving mind. Otherwise, or without this subordinating law, we could not feel hunger, thirst, pain, only at periodical times, or in certain states of the system. This union of the mind with the molecular action of the living body—*base—main-spring*—as I have said, of all its functions, really exists, and is most unprofoundable. These two sorts of sense again resemble in this—no external agents cause the perceptive impressions in them. The mind, in their excitements, simply feels the changes healthy or diseased of the organism; and to these changes, undoubtedly *molecular*, the impressions appear to be due. In this respect they differ precisely from the external senses, which, for the mind's perception, require an

* Galen applauded himself, has been applauded, for curing a renal affection by a blister low down on the back, which had resisted one on the shoulders, and all other treatment. He could not have known this *arrangement*, or the reason of the cure.

impression ab externo. But if they differ from the external senses, their nerves, immersed in the substance of the organs, differ not less, in having no peculiar manner of terminating their extremities. Though both are internal, they are dissimilar in the ends they subserve; the one presides over the empire of our disease, the other, of our wants.

I have represented the pathological sense as being active, exciting the brain only in the seasons of disease. But if the observations of Georget, Lobstein, and others are to be trusted, in certain states—somnambulism, animal magnetism—this sense must be regarded as capable of imitating, in its action, the external senses—as in persons reading sealed letters hid under their clothes, seeing the condition of their own viscera, the countenance of the foetus in the matrix, &c. In all such cases it presents the causes of impression to the mind or real objects. May its anomalies one day throw new light on the philosophy of natural vision? To its irregular movements must be due, the existence of all real apparitions, spectral illusions, soon to follow in order.

3. *External senses.*

By the two sorts of sense just reviewed, we know the organism in the different states—our organic selves. By the external senses we know other existences. All the nerves of these senses, which transmit the elements of the mind's perceptions of external objects, arise with ganglionic swellings on their roots, terminate each in a manner peculiar to itself, and have complementary apparatuses ancillary in the execution of their functions. The form and constitution of these apparatuses and terminating nerves, are respectively accommodated to the immediate forms of matter, which are to make the impressions. And their properties, the union of the mechanical and vital, are, on the one side, precisely adapted to react on the form of matter offering the impression, and on the other, as we may suppose, to receive, and transmit the impression offered.

Thus, for example, in place of the retinal expansion, if the optic nerves terminated cylindrically after passing the cranial foramina, they would be adapted to the intercourse

or impression of a body solid like themselves, and not to a substance tenuous and diffused like light. The whole structure of the eye, all its properties vital, mechanical, modify the course of light, and the manner in which it exists in nature. If its stimulating intensity and conditions were of themselves competent to its function; from the simplicity of nature, the optic nerves ought to terminate in the form they approach the eye. The retina and complicated structure, therefore, are necessitated to afford light, competency or efficiency in vision.

And, since this substance radiates in straight lines from the solar centre, and the arc of a circle, which would unite any two rays, widens as the distance increases, so true is this, that the same eyes or eyes in the same creatures, to see in the different provinces of our system, would require continual modifications to accommodate the growing tenuity from expansion of the rays, or density, from nearness to the sun.

From the elastic structure of the external ear to the gelatinous liquor, *vibratile lymph* of Cotunni, amid which floats the soft, pulpy, fibrillous expansion of the *portio molis*, the power of undulatory movement seems to have presided over the formation. The vital and general physical properties, the whole structure, apparatus concerned in achieving audition, harmonize with the sonorous radiation of the air, or form of matter, which makes the specific impression.

Not less than those of sight and hearing, are the organs of taste and smell, in form and make, accommodated to the sapid and odoriferous molecules of bodies, which specifically excite their functions.

All the nerves of touch, the primordial or elementary sense in the opinion of philosophers, according to Ch. Bell, arise, with those of the other particular senses, from the brain and spinal marrow, as noticed, with ganglionic swellings on their roots.—“I have ascertained, and proved by experiment,” says he, “that all the nerves, without a single exception, which bestow sensibility from the top of the head to the toe, have ganglia on their roots; and those which

have no ganglia are not nerves of sensation.”*—The nerves of touch penetrate the chorion, and terminate in variform, pulposus expansions or innumerable papillæ. By their union these papillæ form the second coat or layer of the dermis; and become erectile on being excited. Over this coat is spread the mucous one of Malpighi, which the papillæ perforate, destined to sustain them in a moist and pliable state; and the meshy covering, formed by the sanguineous and lymphatic capillaries, which envelop the papillæ, and have filamentous attachments with the epidermis.

As regards, however, this minute and complicated form of the organ of touch, I may say, anatomists are not exactly agreed. M. Chaussier denies this superposition of layers, regards it rather as “the fanciful conception of the mind, than the result of observation;” and sees in the dermis but one *trame* or body composed of dense, lamellar, decussating fibres, in which terminate in papillæ the last extremities of the nerves, the exhalent and absorbent vessels. While in the mucous body alone of Malpighi, M. Gaultier could distinguish four distinct lamellæ; M. Dutrochet three; but Bichat denied the existence of the pretended mucous, and formed this membrane of the extremities of the lymphatic and sanguiferous vessels.

Debatable as may be the precise structure of this organ, the papilliform termination of the nerves—an amazingly delicate membrane, which envelops the papillæ, as I may say, in an atmosphere of continual moisture—whatever concerns the essentialities—command universal consent.

Speculations on the manner of their action, and of the action of external bodies, their stimulators.

If, then, the retina be kept moist by a serous exhalation, and the whole organ, by the mucous and lachrymal secretions, the *portio molis* is immersed in the gelatinous liquor of Cotunni, the pituitary, and gustative membranes are moistened by their mucous and glandular effusions, and the papillæ are kept soft by the *rete* of Malpighi or a membrane performing an analogous function. All the organic seats of

* An Exposition of the Nat. Syst. of the Nerves, p. 160.

the senses, therefore, by which we know an external world, are reduced to one condition—enveloped in a gaseous or liquid molecular form of the organic matter. Since the condition is one, is the manner in which all external bodies operate in producing sensations one and the same?

The material forms which produce the various sensations, we know, are all different. The eye is not affected, does not see the odoriferous molecules, which cause the sensation of smell; nor is the olfactory sense affected by light. I have said, all the forms of matter stimulating to sensation, are specific in relation to the senses they stimulate. We may, therefore, conclude, the different sorts of sensation achieved by the several senses, depend both upon the varied forms of matter, and upon the different modifications of the nervous substance of the organs. The corporeal forms causing sensations are varied; and since light, odours, the cause of sound, immerse at the same time the whole of our bodies, and affect only the senses in relation to them, we must infer the properties of the nervous matter are varied in the senses themselves. But, since we see the external sensitive organs are all reduced to one condition, is, I repeat, the manner of the action of all corporeal forms one and identical?

In the actual state of knowledge, there is a strong inclination, not to say solicitude, generally felt, to adopt the unity of the manner of this action. This may be attributed to the great developments recently made in electricity, galvanism, electro-magnetism, and, in every branch of natural science not at all or very little known to antiquity. The discovery of the laws of these substances, some of them new, is rapidly raising them among powers to the supremacy of the world.

When experimental electricity, if I may digress a moment, had only commenced, Newton already supposed the interplanetary spaces were filled with a subtle fluid, to which the celestial motions might be due. Hoffman made this fluid or æther, which he regarded as existing diffused in all bodies and space, the principle of life itself. Derived from external space, it is, according to him, secreted

by the nerves; and diffuses life through the whole system. The evolution of the entire organized body is due to the concurrence of the particles of this fluid, each of which is "*conscious*" of the wants of the organic molecule, it holds in its vital embrace. This fabric rude and uncouth of the olden time, compares badly with the similar ones of our modern, theoretical physiology, built up symmetrically of materials polished, and more ample.

To proceed.—All progressive investigation of these agents seems rather to confirm than conflict with the belief, that they are the causes or are concerned in all the movements of nature:—Or that *polar motion* is fundamental—the base of all others.

Accordingly, it is not improbable, the movement in the various species of matter, I have mentioned, as light, odours, et cet., which stimulate the senses, or produce those changes which become perceptions, may be polar in the gaseous or liquid form. The reduction of all the external senses to one condition—a humid state—may accommodate this sort of movement, and make it still more probable. We know when the tongue is dry, the application of a sapid body excites only the sense of touch, and not the specific sense of taste. The loss of proper humidity or too great dryness of the liquor of Cotunni and *portio molis*, and of the olfactory organ, impairs or destroys hearing and smell. And we may judge, the simple privation alone of the moisture of the papillæ and retina, would effectually subvert their functions. This humidity which envelops all the external, sentient extremities of the nerves, appears as essential as the structure itself in achieving impressions, and a condition, on which rests all our knowledge of a material world.

If we take the cutaneous papillæ for the model, we may regard the expansions of the gustative, olfactory, and auditory nerves, and the retina, only as so many variform papillæ; all answering, concurring in nature to the same end. All these papillæ look directly to the vital economy. The various ancillary apparatuses with which they are armed, enjoy direct relations with the forms of matter, which immediately

excite the impressions; and form the union between the forces of these forms, and the special force of sensibility. And, for three of the senses, we see, that light, odours, vibratory atmosphere are three of them.

Since light penetrates freely the hardest substances, as glass, diamonds, it must be of amazing tenuity. The odoriferous molecules are too minute for all optic glasses. The body or base of the atmosphere is unknown; but many facts make it probable, it is a sphere of fire, whose raging flames are disarmed by being saturated with different substances of heterogeneous affinity. Like these three, are the other two forms which excite taste and touch really tenuous or subtile?

All bodies are not sapid, and those which are, only become so by their molecules being dissolved or moistened by the secretions that cover the seat of taste. These attenuated molecules may be looked upon as the true stimulators of the sense. But all bodies of sufficient volume and density are alike under the empire of touch. Are then volume and density real elements in the excitement of this sense; and does it differ in its conditions from all the rest? To the senses of sight, smell and hearing, the exciting matters come already attenuated—prepared to make the impressions, while the sense of taste, we see, attenuates the sapid bodies for its own excitement. But is the sense of touch anomalous? does matter, I repeat, in all its gross forms, without any elaboration, excite it? From analogy we should not think so. The epidermis covers, isolates the papillæ; they are not contactable; and we see no elaborating menstruum as in taste. What then immediately approaches the papillæ, and stimulates in the exercise of this sense? We know all bodies are saturated or hold in equilibrium in their interstices matters the most subtile, penetrating. When beat or rubbed, some grow hot and ignite; others attract or repel one another; and the ratio of their adhesive attractions becomes altered. It is, therefore, the most probable, these tenuous matters penetrate the epidermis, and stimulate, as they exist in nature, immediately the sense of touch, as light does the sense of vision,

which may be only another form of these same matters. That it is not the surface, volume, density, or figure of bodies, which excites the sense of touch, but *effluvia* or subtile, *photoid* substances, which exist in all, and envelop their surfaces, will be rendered still more probable in a future chapter, where we are to discuss sensation.

All the extremities of the nerves of the external senses, as we have seen, whether they terminate in retinae, papillae, or fibrillous expansions, are analogous, look to the same end, and are reduced to the same condition in the humidity which covers them. And we have noticed the high probability that all the forms of matter stimulating immediately to sensation exist also in the same state, or are reduced by the provisions of the living economy to the same, to excite the impressions—*that of tenuity or subtile liquidity*. Those of touch cannot actually be demonstrated so to excite, but from analogy, for the reasons given and many others, we may believe, their manner of activity does not differ from the others. Consequently, if not entirely certain, it is extremely probable, the action of all bodies producing sensation is the same,—that it is molecular, and takes place between the imponderable substances which penetrate these bodies, and a substance equally imponderable with which the sensitive organs are surcharged.

We may regard, with physiologists generally, the brain and nerves, as constantly generating, by a chemico-vital movement, a peculiar gaseous substance, which is rapidly expended in all the operations of the economy. This substance radiates from the brain along the nerves, but is prevented from escaping, we venture to think, by the non-conducting properties of the liquid, which bathes or moistens their sentient extremities. That this liquid may prevent the escape of the brain's radiating substance is proven from the fact, that it exists in constant accumulation about these extremities ready to be exploded in sensation. If it be not so, why do all the senses quickly tire on intense exercise? The fingers passed rapidly over rough bodies, as coarse sand, soon lose all sensibility. And why is this sensibility so

quickly recovered, or the radiant, cerebral substance, re-accumulated?

If then the form of matter, which excites sensation for the whole material world, be gaseous, the organic form of matter the organism furnishes to receive the excitement, is also gaseous or subtile. And since, so far as investigation has gone, all the atoms of compound bodies are endowed with bipolarity,—probable parent force of all chemical affinities;—and the imponderable fluids, one of which, light, stimulates vision, are known to be bipolar, we may be pretty certain, the movement all external bodies offer causing the mental phenomena, is of the same polar or polaroid character.

But does the movement received by the senses and transmitted to the brain by the conducting nerves, continue polar and the same?

Anatomists have observed, the parts which a single nerve supplies, are in so great disproportion to the volume of the supplying nerve, that it is impossible it can be present in its substance by ramification or fibrillous expansion in all the parts; and yet the whole surface is as sensitive to puncture as if the nerve itself were touched. Holding the truth of the axiom,—*corpora non agunt ubi non sunt*,—they have therefore felt themselves compelled to infer the existence of an organic, subtile substance, which surrounds the nerves, by which they can extend their action and influence beyond their presence, in imitation of the polar agents.

The researches and active reason of Reil first forced this view upon him. Aldini, Humboldt, Rolando, Cuvier, are among its most illustrious advocates and interpreters. The experiments of Humboldt, the experiments of W. Philip, repeated and approved in France,* show most incontestably, that the nervous action, with a certain degree of intensity, can pass across the solution of continuity from one part of a divided nerve to the other. All the experiments and investigations of the most enlightened men, seem to concur in establishing the existence of atmospheres in the organism of an amazingly mobile and penetrating substance, elaborated

* Vid. Vavasseur—De l'Influence du Système Nerveux.

by the brain, which can act at a distance on nerves and muscles in imitation of electro-magnetism.

According to Beclard,* Lobstein,† this noble, hyper-organized substance is secreted by the nervous pulp from arterial blood during the chemico-vital process, passes along the interior of the nerves, flows over their outward surfaces, and beyond their extremities forming about them atmospheres, penetrates, impregnates the tissues, the blood and all the humors, and contains in it the sole active principle of all sensibility, vital motion, and unity of the living body.

By the experiments of Ch. Bell the first, a strong title to glory, of Magendie, and Beclard, is established forever,—that the nervous fasciculi and spinal chord are compound organs;—that the filaments in the same nerve, whether they transmit impressions or movements, execute the same functions throughout their whole extent;—that all the spinal nerves arise with double roots, the posterior roots are armed with ganglions, and convey impressions or sensations, the anterior, motions;—that the posterior part of the spinal marrow to which correspond the nerves with ganglionic roots, enjoys encephalic relations or transmits sensations, the anterior part serves for movements.

This distinctness of organs in organs so pertinaciously preserved; this rigid individuality of structure and function; these separate conduits which lead to and from the great encephalic centre—city of thought;—highways lying through the organism, that wind but never intersect; all combine to give nature utterance, that she has a material, subtile agent, which traverses them only manifest by its effects; and, that this agent is armed with forces against itself, and cannot pass at the same time in opposite directions through the same channels. The character of these forces is most evidently polar, which, to the honor of our species, human ingenuity has reached, and partially unveiled through experimentation.

What then shall we conclude?—one parent force reigns

* Elements of General Anatomy, p. 480.

† Treatise on the Structure et cet. of the Symp. Nerve, p. 104.

and occupies universal space; in its mighty sweep animates all the celestial orbs with motion; heaves out from them the fires of day; holds their poles in the steady balance; fastens, shadowy things, their orbits in adamant; kindles up the fire of lives by organization; pushes them furiously through endless generations, preserving their proper types; lays hold on the brain it has fashioned, and gives to thought and contemplation form and being? Alas! if the essence of our mind were but the special sequence of such a force, and by innate tendency would resorb into the eternal Sensorium of nature, how brightened would be the miserable fortunes of our miserable race!!

But with all the simplicity we believe nature possesses, can we admit such a force? Can we attribute all the multifiform, physical phenomena, which impress our senses or we perceive, to a force like this, endowed confessedly with capabilities of operating only in two opposite directions? Is it warranted by the actual order of the world vocal in its own philosophy; and can we arrive safely at its conception?

No doubt the polar form of motion, which may be the elementary form, holds under its domination most of the other forces, and reigns the most extensively in nature. But we can observe the manner of the great triple action of the world, and the particular, corresponding forces. The particular forces of matter attract or repel as in the stellar motions; or they liberate and recombine the elements of bodies, as in the imponderable or chemical attractions. But after all the changes through which the latter conduct—after all their operations in the oblivation of cities, all the works of men, of the earth's geological faces, these bodies remain in the same mineral state. We are reared up from the dust; our sickness, health, our breathings, pulsations, assimilations, absorptions, secretions, calorifications, groanings, dyings,—have no fac-similes in this *minerality* of matter. They are the special phenomena of the special force of life, as sensation, reflection, are of the special force of mind—forces which mark the triple action.

If, then, this gaseous, imponderable substance attested by

experiments the most wisely conducted,—secreted at the moment of assimilation by the nervous pulp,—principle of all sensibility, motion, and unity,—which, transmitted from the seats of its secretion, form atmospheres in the organs, through which the nerves, in imitation of the imponderable agents, can extend their action beyond their extremities and surfaces, as in the passage across a divided nerve, the assimilation of the alimentary matters to the tissues out of vessels, transmission from one muscle or organ to another;—if, I say, this subtile, imponderable substance be the vital agent itself, the *res organisans* or the *vehicle* set up in the original creation, secreted by the parents, transmitted to the germ by generation, the force, breath of the Omnipotent, which polarizes the dust of the earth, and its face is covered with men, brute animals and plants, *be polar*, as it really appears to be, it is not so in the sense of electricity, galvanism, magnetism.—And if Philip and other anatomical philosophers were enabled to keep up the functions of the stomach by substituting galvanism after all nervous communication had been cut off, and felt themselves warranted in proclaiming the identity of the galvanic and nervous fluids, the time must come when investigation, pushed forward, will sever this identity, and elevate this substance formed by the nervous organ to a distinct and more exalted rank. Accordingly, if the movement external bodies offer to the senses in their impressions be polar, as it most probably, almost certainly, is, the reaction of the senses, which is transmitted to the brain for the mind's perception, cannot be polar in the same manner—a conclusion fully warranted by the order of facts, and the direction in which they tend, presented in this investigation.

ARTICLE II.

Action of the intermediate nerves, which transmit the impressions to the brain.

The nearer we approach the mind itself, the thicker become the shades through which we group. Its nature is

spiritual; is the nature of the Divinity, whose pavilion is dark waters and thick clouds. These shades, which torment, hide us from us, are then the order of the universe. We are more material than spiritual, and, in the impossibility of knowing, attempt to know.

The impressions which the nerves transmit, are the reactions of the senses on the acts of external bodies. These acts, as already, appear to be polar. The sequential acts of the senses purely vital or the impressions appear also to be polar, but of a more complicated, higher order of polarity.

The knowledge of polar motion is only commencing. None can anticipate its future flight. We applaud ourselves for the great age, conquests, dominions of our science. The philosophers of a thousand years to come may look on its brightest, best parts, as the conceptions of childhood. They may profound the compages of forces and their order, or the universal dependence of all physical phenomena—may lift up out of darkness the inverted pyramid of nature's ponderous body—show the simplicity of its first elements; that the phenomena we see are only their last results—unveil how forces generate forces, whose two extremities rest in the same fixed point, in Him who is in all, and all in Him.

Such attainments would present human nature with new aspects in the universe, and make man an august being among other creatures. But as respects the mind, in our ignorance, we only know now, that the material action, the vital action of the senses, of the transmitting nerves, of the brain, are each separate elements in any perception of an external object. We know not their proportions; but may think each organ modifies, assimilates, the material act passing to the mind. Besides the sequential operation of the mind, the perception itself is known to arise from the concurrence of these four sorts of acts. This perception is a new phenomenon—has new properties, relations—belongs to a new order. The brain, which is only a part of these organs, cannot be the true *idea-maker*. For what is new, in good logic, we must infer an invisible cause or agent—the mind—as we infer the existence and presence of an

extremely subtle, mobile fluid, by which the brain acts in the two opposite directions of sensation and volition.

But what are impressions, which when progressed become perceptions? We already know,—1. That three of the impression-making forms of matter are liquid or gaseous; and, from analogy and facts, the exciting matters of the other two are the same.—2. That the nerves of the senses are all modified in their extremities, and moistened by a liquid.—3. That the experiments of Reil, Aldini, prove they are surcharged with a tenuous, incoercible substance, which exists within and about them; a doctrine which enjoys the concurrence of physiologists generally.—4. That the experiments of Bell, Beclard, have made entirely certain, the impressions are transmitted to the brain through the posterior part of the spinal column by the nervous fasciculi, which arise from this part with ganglionic enlargements.—5. That the researches of Lobstein, Beclard, confirm, that this incoercible, polaroid substance, as I may say, elaborated by the nervous organ, is the sole active agent of all living unities, sympathies, synergies—movements.—6. And that finally, the arrangements for making the sensitive impressions, both on the part of the material world, and the vital economy, all indicate the mode of activity to be peculiarly polar.

Upon these general and imperfect bases, accordingly, impressions may be defined—*movements offered to the senses by contact or intervention of bodies, producing a loss of equilibrium or changes in the condition of the peculiar, mobile substance furnished by the brain and nerves, with which they are surcharged.*

Whatever these changes may be, however, which have for their condition the simple contact of bodies, experiments numerous as invincible show, it is the function of special nerves to transmit them to the brain, where they become the conditions of other phenomena—perceptions.

ARTICLE III.

Action of the brain, which, in common language, constitutes impressions, perceptions.

The action of this central, moral organ, is the last thing material about thought. It takes place by an irreducible law of our being, attested to us by observation, disease, accidents, by infallibility of experiments. Its simple truth no philosophy, no age has improved or diminished; it stands alone immovable where time first found it.

The slightest inspection of the encephalon, and its complementary organs, the nerves, evinces it is built upon a vast, a grand model. Every thing about it wears an imperial aspect, shows the diadem of royalty. It looks the seat of empire; the throne of power. The numerous ways that lead from it, that go to it from without, manifest the prodigious intercourse, concern, it carries on with the external universe, and its own economy. In the papillary tissue, filmy mesh-work spread out on the whole periphery of the body, its substance presents one continuous, sensitive surface, to catch every aspen breath, every breeze, motion, impulse that stir in nature. It alimments upon her whole forces; and has a double motion, eccentric and concentric. Its complicatedness; the multiplicity of its design; the sweep of its motion, stand out in striking contrast with the simplicity of all nature's other sublunar labors. Its superb arrangements—magnificence—lofty dome—befit the grandeur, immortality of the tenant which occupies it.

The extreme complication of this entire organ;—the varied abundance, peculiarity of tissues which compose it, wrought into strange and mysterious devices—wonderful compages!—winding canals, polished chambers with arched roofs, passages leading to them;—the distinct parts of the whole separated, united—tubercular irregularity of its exterior figure;—many-lobed form, narrowing, expanding, terminating in the long spinal extremity;—contained in a strong, bony involucrum, sacred depository;—peculiarity of its

nutritive apparatus;—the faces of its distinct organs looking in so many directions;—the number, eccentric direction of its nerves to the whole living periphery—all show it forms the busy, active scene of many different labors, and stands solitary, alone in the world, without its like or parallel, the work-shop of thought.

Here, I may say, in this house of our immateriality, rise the white columns of stalactite; yonder extend the floors of polished ivory covered with carpets of snow; above glitters the shining roof of ample halls. Here rises the tree of life. It lifts up, expands its fair foliage, and ripens the golden fruit,—thought's first, infant form! Yonder, in closed channels, wind rivers of living water to irrigate its roots.

What are these? the lofty dwellings of nature's high priest, whose arrangements show there are concern, communication of the universe. What beside? columns, grottoes, mausolea, monuments, sepulchres, where rest Sylvius, Varolus, Hierophilus, and other great men in immortality, who have, or soon will have, no other existence beside in living records. What else? Anatomists only show us the place each occupies; and point out the sacred spot;—"this is the aqueduct of Sylvius," "that, the press of Hierophilus." This idle exhibition is not anatomy.* Their fruitless labor has not

* In anatomy human, comparative, philosophical, pathological, in our day, new routes to truth have been discovered, new channels of scientific industry opened, and the old science torn down, and remodeled upon infinitely broader and better foundations. It now contains the most various labors, the richest, most precious treasures of human genius. Its great radius sweeps across the empire of most all the other sciences. A most excellent form, still to be finished, a solid, enduring interest have been imparted to it by the labors of Geoffroy-Saint-Hilaire, who proclaimed, the first, "*the unity of organic composition*;" of Cuvier, who profounded the problem of organic animality; of Duméril, Gall, Haller, Hunter, Wrisberg, Sæmmering, Blumenbach, Reil, Humboldt, Vicq. D' Azyr, Chaussier, Borden, Bichat, Tiedemann, Bell, Meckel, Desmoulins, Serres, Magendie, Blainville, Flourens, Laurécet, and a numerous host, marching with the flambeau burning bright in their hands. What glittering ranks on their way to posterity! What names will be more dear to them, or remembered with more profit? How fresh and dazzling will they appear!

The pyramid of glory Newton raised, has been carried up higher, and his

penetrated the interior. These holy utensils and high aim of nature, are sequestered from the approach of their rude, unhallowed science; and the wars they wage sufficiently show the limit of research.

If then we know not mind in its essence, the peculiar forms, configurations of the piece, which finish the top of the material, mind-bearing column, are equally mysterious, and unknown in their uses.

Nature has fashioned this organ of our intelligence in solitude, in the absence of our senses and reason. Man returns upon her to examine her labors. He finds great difficulty in distinguishing even the separate parts; and greater still, in detecting the manner in which they are put together. Their distinct devices, the special, the general ends to which they look, utterly confound him. They fall a prey to his fancy, and become its playthings—horns of beasts, bed-chambers, the arch, tent; the bridge, reap-hook,—become their types. More than twenty centuries of diligent research have passed to little profit; and, in the actual epoch, touching the proper division, construction of the entire organ; the primitive and derivative parts, functions of each, much as has been accomplished, doubt and difficulty still reign; so that by his genius alone, M. Gall could totter the faith of the anatomical world. This investigating man presented the brain as a bag or sack folded in itself, which he pretended to reduce to its first and proper shape. If there be Angels—those above us—who do know, they must laugh.

Truth has commenced at the outside. The compound nature of the nerves and spinal marrow—the distinct uses of their separate filaments and parts—the precise conditions necessary to the displays of their activity—that they alone are the sole agents of all sensations and movements, primary elements of all animation—the various manner of their stimulations for each class of organs—the manner of the conju-

great name is sinking in the shadow. The pile they have reared must still reach a greater elevation; and they too must sink in its lengthening shade. But, like Newton's, it will worry the throat of time to drink up all the rays which cover them.

gation of the organs they supply—the mutations of these organs through different types to final and perfect development—all due to zootomy, comparative and philosophical anatomy, have been reduced to demonstrative certainty. Besides the correction of errors, the rectification of the old, and the discovery of new truth; by the same means, much other truth and reason has been encompassed closely about, and much other still, on the approach, crowds the mental horizon of the investigator.

But the commissures, the septa, falces, hemispherical, lobular, columnar, pyramidal, turbercular forms; the winding canals, chambers, et cet. of the brain itself, and their uses, remain still in the first darkness. The encephalon being the immediate condition of respiratory life, they cannot be experimented upon to the same extent as other parts. And the experiments made inevitably by disease—ramollescence, indurescence, disorganizing phlogosis—have thrown much confusion as well as much light upon them.

But the bare inspection of the brain in man—its great proportional volume—obvious number and diversity of its parts—their double or symmetrical arrangement—their grossness, extreme minuteness, uniqueness of the whole—their unity—the nerves diverging in every direction, dividing, decussating as they go to embrace the whole organism and subject it to their centre—would induce us *a priori* to conclude upon the high and ruling character of its function.

Impressions developed by the senses are transmitted by the nerves to it, and through the concurrence of its action, are said to become perceptions. The course of our discussion has repeatedly made manifest, this action is not the perception itself, but only the simple antecedence. The concurrence of the mind constitutes the impression modified by the brain, a perception.

Prof. Broussais* has argued this point with his fierce logic. He condemns the spiritualists for introducing more causes than will account for the phenomena in question; considers

* Physiology.

the admission of such an agent unnecessary for scientific research, and the agent itself, an ontologism.

With this difficulty between the materialists and spiritualists, no interference can be made with profit. Objects that lie on the border of light, which surrounds us, will appear with more varied and opposite faces than those nearer us. The reasons I offered above for the existence of an organizing nature carried out, will demand equally a perceiving agent within us.

The senses, the conducting nerves, the brain, may all modify the material acts, which are perceived. The rapidity, instantaneousness of the intellectual phenomena, indicate to M. Bérard* the presence of the mind in every part of the body. Yet however instantaneous, it must be conceded, this series or succession of living acts precedes every perception.

Such fierce motion confounds our reason. But if we admit what must be certain, the immediate agent of this movement is a locomotive product of the nervous substance, it cannot, from the number of sensations possible in a second, excel, in its greatest velocity, that of Mercury in his orbit; or of electricity, which, from experiment, Franklin concluded, could it be conducted, would make the circuit of the earth in imperceptible time. It yields to the velocity, with which gravitation emanates from the heavenly bodies, as calculated by La Place, noticed in this work.

The impulses of external bodies are transmitted to the central organ with tremendous velocity. We see no connection between the reactions of this organ upon these impulses, and the new order of phenomena the mind sequences from them. "The undevout philosopher is mad"—will stop short, not let go materiality, because his senses are mocked, and he cannot behold events *in natu*—behold the intermediate shape of thought. But he should remember, that perfect vision, the reins of all truth, are in the Divinity, the world's fundamental idea; and that they are dispensed to him, to us, by the eternal reason, of which our intelligence

* Dict. des. Scien. Med., tom. xvi. p. 438.

—the whole frame of things—is but the simple, unvarying order.

CHAPTER XI.

RAPID HISTORY OF THE UNDERSTANDING.

THE manner in which nature brings forth the mind, and unfolds its action is one thing; the opinions men have formed of its constitution and powers are another. Its history is both natural and civil.

Its natural history modifies by age, sex, the industrious occupations, institutions, letters, sciences; by locality, climate, all the varied faces of the world; and by all the varying conditions, states of society, amid which it develops. The mind does not wear the same forces, manifest precisely the same phenomena in any two localities or conditions; but varies from the savage state, through all the gradations, to the top of European civilization. The varying quantity education gives, is more or less accidental. Its civil history regards it a fixed, immutable quantity, and does not so modify.

SECTION I.

NATURAL HISTORY OF THE MIND.

THE mind or soul appears to be transmitted with life by the generating act. It augments in energy; remains stationary in perfection for a time; then weakens till death. It passes through the different phases of existence here in imitation of the animated body, whose forms, forces are never the same given quantity. This body, projected through the space of time, which intercepts the cradle and the tomb, passes through a constantly varying series of changes. As its tissues successively unfold, its reacting forces augment

on what surrounds; and the encephalon ripens. As it gains dominions in nature, the soul, like it nothing at first, gathers up, arms its strength against the universe, and drinks broader, deeper, more varied thought from the increasing, widening torrent of sensation.

During the first age, the internal senses are mostly active. Our wants return in rapid succession. Dentition, the maladies peculiar to childhood, actuate frequently the pathological senses. We know our wants first, and the pain of disease, which ultimately is to carry us hence. Our doom is written over the threshold, through which we enter into life.

Soon time marks a difference in the minds of the two sexes. The little boy is bold, audacious, indomitable; loves to destroy life; is delighted with the chase, early, long the only occupations of men. The little girl is less fierce and more docible. Her sweetest pleasure is the cares she lavishes upon her alabasters. Thus nature entrusts to woman, in her earliest days, the secret of her destiny. She manifests her love of life, of which she is the depository, hope of our species, by fostering it in inanimate objects.

The epoch of puberty comes with many changes. The nutritive forces hitherto wholly employed in unfolding, maturing the organic tissues indispensable to her own life, now concentrate on the matrix and complementary organs for their evolution—for the life, of which she has the innate love, and the foretaste. The menses rupture; two forms of snow rise from her bosom. The matrix irritates the brain; she has a new moral and physical existence.—Her soul wears a new complexion; the Graces fashion, and give expression to her forms. The irritation of this organ shows itself the creating power of woman. Its work done, her destiny is revealed to the eyes of others. She is ready to enter on the sacred ministry of nature. The most active sensibility overwhelms her soul. She is conscious of the high sexual prerogatives intrusted to her guardian care. Their violation blots her being. She trembles at every leaf that stirs; every passing breeze; and blushes at each word spoken to her.

Soft illusions steal upon her ; sighs struggle in her bosom—love's unformed elements. She weeps ; takes pleasure in solitude, that she may live on a *single idea*,* and her tears not betray her. But if she is feeble and timid, full of soft compassions, nature has armed her in compensation with an energetic, heavenly power, which gives her dominions, homage ; and conducts to her destiny—the power of beauty, represented in poetical antiquity by Eros playing with the thunderbolts of Jupiter.

Decisive changes likewise mark the epoch of maturescent man. He, too, feels these soft and tender illusions ; he plunges the whirlpool of love. His thoughts now fashioned to a sphere of fire, will not articulate in freezing prose. He expresses them in words of harmonious syllables measured in accord with the strains of music. Not like her he loves, he makes his love known. The solitudes he frequents echo with its touching, subduing melody. Like the passion it represents, it imparts life and energy where it undulates. The headlong waves stay their motion to listen ; lions, tigers, wild beasts leave their hiding places, trees descend from the mountain top, to follow after. It forced the only smile that ever sat on the grim visage of the dread monarch of the Shades. Things live to which life is refused. It revives the shadowy forms of the dead ;

—Alta ostia Ditis,

Et caligantem nigrâ formidine lucum
Ingressus, Manesque adiit, regemque tremendum,
Nesciaque humanis precibus mansuescere corda.
At cantu commotæ Erebi de sedibus imis
Umbræ ibant tenues, simulacraq, luce carentum ;†

—strains of the Saturnian land, which still live. The harmony, with which love fills his soul combined with flowing numbers, passes over seas to fill the world ; over the sepulchre, to fill time. Posterity after posterity catch the sound ; and she whom he loves, becomes immortal in the song of her beauty—eternal, heavenly power !

But besides love, whose end is the perpetuation of men, the burning, alluring fires of glory and ambition torment his

* Polygamy is unnatural.

† Georgica, lib. iv, 466.

heart. He is born with the innate love of power. War gratifies ambition,—is the means of glory, remembrance. The Mavortian field becomes covered with flowers, which charm him; he plunges through the blood of his species to possess them. This field too looks elevated in woman's eye, and enables him to compete more successfully on the arena of her love; since she delights to contemplate in him the plenary power of protection. Thus she who gives life destroys it.*

Other ambitions, pleasures, agitate him. Though doomed to death, he revolts at oblivion. He lifts up another sign of himself at which the coming ages will look; and he is not disappointed. In these ages the limits of his organic existence appear an invisible point. In the gloom of futurity he will come forth; in the joy and beauty of his thought, he will live.

From all the amplitude of space, sensations pour in upon his mind. It wades in a sea of contemplation;—feels strong emotions, which it reflects beyond itself. From the cloudless top of mountains reflecting the dark blue light above; or valleys darkened with trees, and overspread with flowers—gloomy, delicious haunts—it hears voices calling it; it is the voices of these strong emotions it has felt; the voices of the *first philosophy* or of the Muses, whose beautiful mother, according to the Greeks, was Memory.

These voices announce the birth of Fancy, which comes forth in the burning, many-colored garments of Iris—eldest, fairest born. To aliment these emotions calling to it which now have an external existence and a name, it tastes the fabled waters of the Castalian font. It undoes all the compages, the mighty form of things; reveals to nature new models of her own works; rebuilds them anew; and throws over her noble form the glittering vesture of poetry. This

* It was the white-bosomed maid of Fingal's land, who was the shining edge of Oscar's sword. It was the buckler of Æneas, the gifts of Mars, which distracted the tender-hearted Eliza, queen of Carthage; and the Roman eagles with their gory talons, which the beautiful but worthless Cleopatra admired in her shameful amours.

vesture pleases it, which comely, it desires she should wear. Ages on ages look on it, and feel but joy. The texture, the threads which compose it, time cannot break, or diminish the radiant beauty. Who does not blot, but adds a new coloring, or weaves a single thread, is immortal.

Or, from all the remoteness, the secret depths of things, impressions come to it. These impressions arise from its reflection upon its first or simple sensations. These impressions are the elements of the second philosophy, which reaches the discovery of the ancient, unknown Being. It faintly perceives their order; it is the order of this original, Unknown, which, from the manner things begin, it calls nature.* A new, ineffable pleasure transports it. It has a model or pattern before it. In this model it beholds beauty, excellence, perfection. It is the first, the ancient model of things, existent before its own career began. It evinces to have been framed in the remotest antiquity, by a most perfect and noble artist. This model, pattern, is a hallowed thing. Admiration, joy, veneration fill the laboring mind. In every thing it searches but for this model, order or the traces of it, and combines sacredly its sensations, the separate elements of its conceptions, reasonings, according to it.

Every thing presented from without comes individual, distinct. It invents powers, properties, forces—many things of different names—giving form and being to language; and shapes its sensations according to the inspirations, teachings of this ancient order. By these properties, forces, which it has invented, it combines together into groups the elements of its separate sensations or its distinct perceptions. These sensations are the representations of the phenomena of nature in the mind, or what it feels in all external objects. It fur-

* Females obviously produce. In all ancient, civilized languages we find females divine productive causes. Freya gives life; Ops, the Rhea of the Greeks, is the Magna Mater, who originates, nourishes. Deus, anciently Dius, to which is connected Dies day, is masculine, but *Deitas*, the *godhead*, mistress of creative power or of all the sun's rays, is feminine. These two last evidently came into Italy from the East.—Vid. Hobbs on Heresies—Opera.

ther combines these groups into one great complete whole, and connects them with the first property, force—or nature.*

Through these properties, forces, with which it has clothed all beings, it can trace the order of their phenomena, their reciprocal actions, influences, changes—their history. These properties, forces constitute the manner in which the mind sees the universe. The epoch of their discovery is the natal epoch of science, or the second philosophy—the creature of much labor, in which it venerates this ancient order, achieving instrument of its strength and glory.

Animated with the increase of power and dominion, it desires to sink deeper into the universe, and widen the limits it occupies. To extend the sphere of its impressions on the senses,—Eden-ruined creature!—it fashions glass, apparatus; returns to reinvestigate; correct its first errors, establish this order, and perfect its homage.

Still, desires more voluminous, anxieties ever increasing, agitate, torment the mind. Where is the First, the ancient Being, who originated this order and fixed it forever—the first Nature to which the study of the second has conducted me—the eternal, unquenchable fire, of which all truth is but the kindled flame; of which a single ray moulded me in the image—the everlasting, immovable basis of beings, things? Fountain of incomprehensible radiance, from which spring all science, poetry, life, in which the stars dip their disks, and are covered with rays forever; of which, if man get but a glimpse, the flower of his civilization springs forth; his joy springs up in the earth with the melody of his lyre? O! depth of beauty, love, pleasure, good! I have seen what bears my own image. But where is my first Kin? the elder light, of which all visible lights are but the reflected shadow? Where are the resorts of the Great Invisible? Amid what

* Thus all the siderial motions group into one *property*—*gravity*; the chemical motions, into the molecular or imponderable *affinities*. All the phenomena of life form one or two great ideas, *excitability*, or *sensibility* and *contractility*, properties:—all the phenomena of the mind group into *perception*, *memory*, &c. All these separate groups combine again in one productive *property*—*nature*; beyond which they are nothing. These properties, forces et cet., form the skeletons of all the sciences.

gleaming lightnings, loud thunders, lonely, sequestered solitudes—amid what dimensions, what infinities, heights, depths, do the turrets blaze, which point the spot? I have hurried through the great body of the world, mounted along its lofty top. Everywhere, amid the gloom, I behold the signs but see not, only feel Him I seek. Inspiration compassionate comes; discovers what it desires to know. It now worships the first Nature, God, with knowledge, to which the order of the second could not conduct it, or make known.

We cannot stop here to notice the modifiable mind or its various accidental quantities—a prodigious topic, broke by piecemeals in numerous works. Its modifications, however, by governments, occupations, climates, localities, by education, are rigidly limited in its original constitution or capacity, which obviously differs greatly in persons born and brought up under all the same circumstances.

Its distribution.

The radical principle of intelligence constitutes an original part in the design of all animation. Plants must distinguish their proper aliments, and feel the stimuli, which impel to their vegetations—phenomena of their lives. Its manifestations in them are obscure in the extreme. They only have excitability—some of the first, most simple organic conditions for its elaboration. It is, rather, only some of the simple preparations for it, which they enjoy—the early dawns.

Alimentation being the mode of all lives, and all the animal being momentarily destructible, they must distinguish, appreciate their food and danger; move their parts to absorb what nourishes, to avoid what injures; approach, appropriate food by volition, by volition fly from danger. Mind, therefore, being a fundamental, living function, is inseparable from the idea of all vitality. It is apportioned to each animated being, according to the figure it is to make in nature.—Or it is distributed throughout the great, living scale in proportion to the general perfection of the organic structure, and of the nervous system especially.

In the portion of this scale comprehended under the hu-

man species, in quantity and intensity, mind varies as much, perhaps more, than in any other part of the descending series: so that the natural history we here epitomize, applies only to the highest or Caucasian variety. The mind, which unites the lowest of the animals with the highest of the vegetables, may be found to be more assimilated than that, which unites into one whole the sable savages of Cape of Good Hope and the polished people of Europe and America. Hermes from Heaven with letters, I may say, has appeared to the ancestors of the people of these countries; but the Hermes of the Bos-jessmen has not yet descended.

Philosophers delight to trace a regular gradation of organization and intelligence, from the bottom to the top of the inverted pyramid of life. A gradation difficult to be precised in all, no doubt exists, but we may think, with some deviations. The greatest deviation, as respects the mind, appears to exist between the highest and lowest of man, which can be but very partially attributed to climate, locality, education—accidental causes.

To illustrate the manner in which mind, original force of creation, is distributed through the great groups of the animal scale, I will translate a table of Lamark's, contained in his Treatise on the Nonvertebrated Races.

1. Animals simply sensitive and irritable—the *Zoophytes* and *Radiaria*.

2. Animals sensitive, irritable, manifesting instinct—*Cephalic*, *Acephalic Mollusca*; the *Articulata*—*Chyrapodes*, *Crustacea*, *Arachnides*, *Insectæ*.

3. Animals sensitive, irritable, possessed in different degrees of instinct and intelligence—the *Vertebrata*—*Ophiidia*, *Fish*, *Birds*, *Mammifers*.

SECTION II.

CIVIL HISTORY OF THE MIND.

THE mind, of which we have just noticed some of the phenomena and history, in several councils, Lateran 1. under Innocent III.; Vienne in Gaul under Clement V.; Lateran

3. under Leo X. ; and others, was decided by the Catholic philosophers, bishops, to be immaterial, immortal ; no part of the divine substance, nor of the celestial domicile ; but is created out of nothing, and supplied according to the number of bodies. The Fathers of the church in council decided further, that there is but one soul in each body ; and, by enacting laws for the country's faith, put down the opinion of two souls as entertained by the Platonists, Averrhoists, and Manichæans. But, remarks Gassendi, " while they rejected, in the 8th article of the general synod, the opinion of many souls in man, they condemned only the dual number." In their view, they adopted the fundamental principle of Aristotle, that the soul fashions and evolves the body, which, we know, Stahl made the base of his system. Against this opinion Leibnitz wielded the powerful logic of his mind in discussion, and had Plato for authority.

In opposition to the authoritative decision of these Councils, it has been thought by good philosophers, there is a passage in the 104th* psalm, which favors, if it does not establish, the opinion of Plato and other ancient sects ; that there is in man a particle of the divine substance—something divine. According to Plutarch,† St. Jerome,‡ Ireneus,§ Theodoret,|| St. Augustin, Athanasius, and other Fathers, this belief was very widely diffused, and generally entertained. St. Augustin exerted all the force of his eloquence to put down this error ; and we have seen, it was condemned by different synods. This beautiful and sublime passage can only mean, that God controls all power ; in him with all other existences, we live, move, and enjoy our being.

Respecting the nature of the soul existing in other creatures than man, much difference of opinion also exists. All nutrition—vital chemifaction—as all mental phenomena, imply sensibility as the first condition. All organized beings are nourished ; they are, therefore, sensitive ; and sensitive,

* " Thou hidest thy face, they are troubled ; thou takest away their breath, they die, and return to their dust. Thou sendest forth thy spirit, they are created ; and thou renewest the face of the earth."

† *Questiones Platonicae.*

‡ *Episto. ad Marcellinum.*

§ *Against Heresies.*

|| *Divine Decrees.*

they have thought or its shape. Gomez Pereira and Descartes strangely refused minds to brutes. L. Vives accorded to them a peculiar soul. T. Willis regarded it in them as a subtile, explosive fire filling their nerves. Condillac* sees no difference between the souls of brutes and men only in the relations of more and less. Pherecydes and Pythagoras his pupil taught, the first, that all the acts of animals are due to the ingenious, mechanic art of nature, and are purely automatic or mechanical. Buffon, possessing the pride of originality, pushed more than twenty centuries up higher in the inverted pyramid of human wisdom, which all ages are engaged in building or demolishing, adopted this Pythagorean idea of the mechanical nature of brute minds, but with some improvement. He allowed them sensibility enough to feel pain and pleasure to direct them on the course of life.

According to Galen, Hippocrates admitted an intelligent, governing principle both in man and animals. Aristotle discovered in the latter some traces of human reason and foreknowledge. Galen beheld in them *ενδιάθετον λογον*, or an internal reasoning faculty. We have the declaration of Stobeus, that Democritus and Parmenides accorded to animals the power of discovering future events, and other intellectual faculties in a very high degree. Upon the authority of Sextus Empiricus, Empedocles discovered some traces of sagacity and knowledge even in the movements of plants.

The dogma, opinion of Pherecydes and Pythagoras, that animals have no soul but in material mechanism, was combated and overthrown by Lactantius, Porphyry, Plutarch, the Cardinal Tolet, St. Thomas, Zerbis, Arnobius, and others. That intelligence is a common principle proportioned out to all living natures, as taught by the venerable Hippocrates, prevailed with the little truth that lived, during the middle ages, we have the authority of Philoponus, Albertus Magnus, Cardan, Magius, Laurent Valla.

A thing marvellous. This intelligence of animals so often denied, so often declared, which is said to have taught men

* *Traité des Animaux.*

first the use of many medicines in disease, in modern times has yielded its inspiration to the geometricians, and enabled them to go beyond the old boundaries, and walk in new paths of truth. The hexædral cells of the honey-bee, suggested to Maclaurin, and other mathematicians, what without, their genius could not reach—the convenient data—upon which the *maximum* and *minimum* of varying ratios might be calculated.

Many look upon the instinct of animals, as supplying in them the place of reason in our own species. Misled by this opinion, Locke refused instinct to man. Hutchinson and Shaftesbury opposed, and overthrew him in this particular, which enjoyed the concurrence of Reid, D. Stewart, Priestley, Smellie.

We all remember the beautiful eulogia of Darwin upon instinct, particularly that of insects. Cudworth explained all instincts by the operations of the “plastic force.” With Leibnitz they meet an easy understanding by the movement of the monads in the system of his pre-established harmony; who with other philosophers thought it not unworthy of the plans of the Divine Being, to assign brutes a paradise for the enjoyment of another life.—And especially, since many of them suffer much cruelty and injustice from us here; and some, after a laborious life in our service, yield themselves food by a premature, unmerited, and violent death. Plutarch and Rorarius lavish praises upon them for abstaining from excesses, vices; for their virtues; for leading a life more in accordance with the laws of nature, and making a wiser, better use of their mental faculties than men.

Pliny thought the smaller class of animals were the best specimens for the successful observation of their instincts. Some German philosophers, out of the spirit and sense of Pliny altogether, maintain the intellectual faculties are great in proportion to the diminutiveness of the organization. They look upon matter as detrimental, and opposed in its very nature to all intellectual activity. Dr. Christ. Krause of this school, conceives the soul of the microscopic animalcula to be vast and sublime beyond all comprehension.

Properties or faculties.

Very great doubt and difficulty exist as to the exact number of these. Bacon, after the ancients, admitted two souls:—The one sensitive; has for faculties, *sensibility* and *voluntary movements*; the other reasonable—faculties—*understanding, reason, memory, imagination, appetite, and will*. Martini admits only three: *Appetites, sentiments, passions*: Richerand, nine: *sensation, perception, attention, memory, imagination, association, comparison, judgment, reasoning*. De Brosses establishes three faculties; the *will, intelligence, memory*: Descartes, four: *the will, understanding, imagination, sensibility*. Hobbes, two: *to know, and to move*, of which he made four divisions. All thought, according to Vauvenargues is composed of *reflection, imagination, recollection*. According to Broussais, founding himself upon the axiom of MM. Cabanis and Destutt-de-Tracy, *que penser c'est sentir*, the power of reflection constitutes the character of the intellect. The essence of all its faculties *is feeling*; and all its operations are included in the proposition,—*I feel myself feel*.

T. Brown made no faculties; but regarded all the mental acts only as the *varied states* of the mind itself. Condillac discovered the first—worthy of the brass and the marble—that signs or language is as essential to the production as to the expression of thought. He made *sensation, attention, comparison, judgment, reflection, imagination, and reasoning*, faculties. M. Diderot reduced all the phenomena of mind to the *memory* of sounds, and *imagination*. The number of faculties, however, which seems to enjoy the most universal consent, are sensation or perception, judgment, memory, and imagination.

CHAPTER XII.

INTELLECTUAL OPERATIONS—FACULTIES.

SENSIBILITY, one of the laws of the plastic organic nature, as already, is the condition, common base of all these operations, as it is of all the acts which organize the body. It forms the sole active union between the material, organic, and spiritual economies; and its action always intervenes the *res sensa*, and the *res sentiens*. It has many modifications as has the nervous organ—its seat. Upon these modifications depend all the diversity of our perceptions and ideas, the elements of so many separate sciences.

By some of these operations we know the objects of an external world; by others, the relations of our organs to these objects, or our wants. The ideas, to which these two classes give rise, form all the physical and moral sciences. By others again, we know the diseased acts of our organs;—the emanating ideas is medicine. Accordingly these operations form three classes correspondent to three sorts of senses and impressions.

In the perception of some objects we feel no interest—like or dislike; in that of others, we feel an interest, are affected. In the first, the brain simply concurs; in the second, the internal nervous system. In consequence of this difference, philosophers have felt themselves warranted in dividing all the mind's acts into two classes;—the *knowing* and *pathetic*; or the *intellectual* and *moral*. Since our wants look externally, and disease does not—is not moral, a third class should be added to comprehend it—*pathological*.

FIRST CLASS—INTELLECTUAL.

SECTION I.

SENSATION—PERCEPTION.

IN rigorous definition, sensation, from *sensatio*, *sensus*, *sentio*, I feel, expresses only the action of the sensitive organ affected. But this action simply does not provoke the mind to activity; and, without the concurrence of the conducting nerve and brain, is nothing—cannot say, I feel. If the mind reacted directly on impressions, or the stimulated senses, then sensation and perception would be different phenomena. But since the consecutive efforts of other organs are indispensable, no distinction between the two can be made with profit or propriety. Attention is often necessary to secure the successful action of the brain and conducting nerves.

Hic—tanti cinxerunt æthera nimbi;
—et inhorruit unda tenebris.

Nature creating instruments is always rich and varied in the results she obtains. The brain, we know, is formed of a great number of very different parts. If all these parts be engaged in fulfilling the conditions necessary to the reciprocal intercourse of our two natures, from all we can observe of the physical laws, we ought to think, the impressions brought to it are modified according to the number of the parts. Sensation, then, the finished action, must differ greatly from the simple external movement in which it begins. However few or many of its parts may be engaged in achieving any sensation, without its concurrence, this sensation does not exist. The brain is necessarily a central organ. All the nerves meet in it directly, or through the spinal axis, that they may conduct the impressions made on all the external senses to its focus. But the affair of perception does not terminate here; at the moment of the mind's reaction, this focus reflects it back to the sense whence it came. Hence the delusion and misnomer of sensation; as if the mind was seated in the sense impressed.

M. Gall, the founder of a neo-iatrological school, has advanced, the whole brain is not indiscriminately active in achieving any one description of mental phenomena; but that its separate parts answer to the distinct faculties of the mind; and, accordingly, he divided it into a number of regions or organs. With all their labors, his disciples have added but little, that is substantial, to the *ébauche* of their master. The philosophical ideas of Gall, prostituted in our day by ignorant persons under the practice of *craniology*, form the most hateful imposition—charlatanry. The improved sense of mankind must revenge the wrong. The noise this system has made is dying away in other noises of the world; and will probably soon be looked upon by all the learned, only as an ingenious, fanciful idea of a great man.

Wherever, however, the truth may rest, in Gall's or other systems, the brain, we know, is the mind's achieving instrument. And to supply the world with thought out of the crude action of matter by such an instrument, it would appear, if I may so speak, it has cost nature much toil and development of much skill.—Senses with a variety of conformations to seize, and concentrate this action; nerves looking centrally for its transmission, multiform construction of the brain, manifest the order of Divine ideas—skill—which preceded, from which such arrangement, contrivance emanated. The senses planted separately on the periphery of the body; their different adaptations to receive the actions only of a definite number of the forms of matter, as light, odors, &c.—the winding of this action along all the nerves of sense to the central focus, where we may think, each action of each sense undergoes a change peculiar to itself—would all inspire the belief, that our two natures possess very decided and marked peculiarities; and, that on the one side, the great nervous organ neutralizes, librates against all the forces of matter, and on the other, restrains thought to its just proportions.

M. Gall has correctly enough said, “a sensation is the perception of any irritation whatever.” A perception is any

irritation felt. These irritations take place in the parenchyma of the organs, as in the senses proper. Their perceptions are either external or internal.

SECTION II.

EXTERNAL PERCEPTIONS.

VERY different from the internal senses, a perception of this sort, we know, commences in a movement foreign to all the sensitive organs. In the one case, it is the movement of the organism which stimulates to sensation; in the other, the movement of the material universe. This latter movement, which fills all space, we know also never varies or intermits for a moment, as is manifest from the phenomena of the cosmic, chemic and other attractions. Its eternal uniformity constitutes the individuality, identity of our perceptions of all external objects through all ages.

This movement impresses on the sensitive organs a change, which, as above, it is highly probable, is of a character peculiarly molecular or polarish. The change itself may consist in a disturbance of the equilibrium simply of the tenuous, nervous molecules, which are in accumulation about them; and prevented from radiation, as I have supposed, by the liquor which moistens them. This change, whatever it be, constitutes impression. By a law not profoundable of the nerves leading from the senses, the impression passes along them, is percolated, as I may say, through their plexuses to the encephalic focus, where it becomes the cause of a new change in the state of this organ. This last change stimulates—or is the immediate antecedent of the mind's reaction, which is perception.

Since the nervous system holds under its sovereign domination all living motions, it must excel in vitality all other structures. And the subtile, incoercible form of matter, it secretes from the arterial blood, attested, believed now by so many able, experimental philosophers, the most organized of all living substances, must enjoy a still higher, more sove-

reign life. All experiments—the great force of reason—quadrate in favor of this form of matter of such pre-eminent life, being the immediate active agent which receives and conveys the impression of all external bodies in sensation; and transmits the motion to the muscles in all volition.*

* This polaroid exhalation or secretion of the nervous tissue affects none of our senses. Many of the chemical elements, agents, are in the same predicament; yet no chemist doubts their existence. They are manifested to his reason by their active agency; or in the sensible changes they produce in other bodies; and are as tangible to his mind as if impressed there by the senses.

The same sort of evidence demands likewise existence for this mobile, nervous agent; the mind infers it, feels it in a host of phenomena inexplicable without it. Behold the great mass of the nervous substance contained in the cranial and thecal cavities; how small is the proportion contained in the nerves, which is to supply all the organs of the body. The only manner of distribution, too, is by filamentation; and in the filaments the nervous matter is kept in mass. Upon this view, how can we conceive this matter diffused through every minute part of this body. Every where nutrition is active; nutrition implies sensibility, and sensibility the nervous presence. Can this presence be everywhere in the body, when so far as can be traced the nervous substance is contained in mass even in the last filaments? If we were to suppose the manner of distribution was by lamellation, and the nervous substance to excel the malleability of gold, such an idea would be of difficult conception. Any hypothesis must give to this substance, as it generally exists in the body, an amazing tenuity.

The general expansion of sensibility; the instantaneousness of vital movements in different and remote parts of the body by a stimulus applied at a single point, as at the moment of perception in the brain, the external object is felt in the impression-making sense; in many of the diseased irritations, &c.; are phenomena, in which the logical mind infers, feels the presence of this intangible substance, in the same manner as gravity, invisible agencies, are felt by the geometrician and chemist.

The two hypotheses of the manner in which the functions of the nerves are discharged—the one by vibration, the other, by a mobile fluid—have wasted ages, and called forth infinite discussion. The latter has been by far the most popular. For its advocates it has had Hippocrates, Galen, the Arabs, Vieussens, Willis, Steno, most all the anatomists of the last age, Sauvages, De Haen, Haller, Descartes, Vanhelmont, Harvey, Burtholin, Baglivi, Barrelli, Spigel, Bonnet, Schelhammer, Senac, and an innumerable host.

Than the history of the “animal spirits,” nothing exhibits better the emptiness, frolicsomeness of speculation. But in our days, by Dumas, Tiedemann, the merits of this subject have been very well weighed, and it

The function, which conveys impressions, that of the brain, which modifies them for perception, is the most vital. Is that, then, which lives, and which thinks, approximated in being? or is intelligence only a higher, more noble order of life, to which the lower or organic, as a mirror, reflects the acts of the external universe, *empty, shapeless*, and they are seen possessing *tangible, colored form and substance*? The mechanism of this metamorphosis must ever baffle all inquiry.

There is another phenomenon, to which I have alluded, and which accompanies all external perception.—The reaction of the mind on the impression modified by the nervous focus, rebounds back to the particular sense impressed; and the perception is felt there, as is expressed in, “I feel with my hands; I see with my eyes.” This law of retrograde movement is not only operative in all the external perceptions, but likewise, in all our internal sensations; and gives to each want, each pleasure and pain a locality in the organism. There is but one exception to this general law, and that is, in the pathological senses, where, in some few instances, the order of the nervous distribution prevents its operation. In these instances, the sensation is misplaced; or is felt elsewhere than in the seat of the primary irritation, which stimulated it—a circumstance, which has misled many practitioners. This law constitutes the essence of the passions, as we saw when treating of the dynamical properties of perceptions and ideas in the chapter on intellectual mechanics.

According to M. de la Romiguere, the mind is endowed with two properties inseparable from it—*passive sensibility*, reduced to its proper value. That the manner of the nervous action is by a subtile fluid, known only by its effects, has been approved of by inductive reason and enjoys the general consent. Indeed, in the last analysis we can make of the fundamentals of all the physical sciences, what advantage have they in this respect? What are gravity, polarity—all the attractions, properties, forces, faculties—all the laws of matter—but the *convenient ways* the mind has learnt to behold the phenomena of visible nature? Are they not veritably only the different ways, in which this nature exists to us; and can we be any more certain of their existence than we are of the existence of this great active agent of the living economy?

and *activity*. This activity is original, innate in it, and a fecund source of ideas. The mind is passive in receiving impressions, is modified by them, but active in their perception. "Les agens exterieures agissent sur les sens, ceux-ci sur le cerveau, et celui-ci sur l' ame; elle reçoit ainsi les impressions qui lui arrivent, mais en est simplement modifiée, et reste absolument passive.—A son tour l' ame entre en action, elle reagit sur les organs, se modifie elle-même, déploie toute son activite."*

But this fundamental activity of M. de la Romiguere does not explain this movement, which strikes back on the senses in all perception.—An activity, which must be in exercise in all the mind's conceptions, volitions, recollections, picturations or fancies—in all the modifications it makes of its ideas from past sensations—activity, which, one day, science fortunate in futurity, may become the creed of all philosophers, and cover in its great shade the beautiful titles of Aristotle, Locke, Cabanis,—the school, which now, for so many ages, has tyrannized, and taught, that sensation is the only original source of all ideas.

The movement in question is synchronous with the mind's act of perception; it is, as it were, the impression recognized by the mind, and returned back to the generating sense. If, from the feebleness of the impression, or inattention, the mind do not recognize, the movement does not return. The mind's reaction, therefore, must be the cause of the return. The movement is of the brain or its subtile, mobile secretion; the cause which hurls it back is the mind. The mind without parts, and yet modifying the direction of the action of a material organ, is an impenetrable mystery. It is here meet what is material, vital, and moral in our being.

But since the impressions of external objects are only the excitements of particular living functions, which can contain none of the characteristics of these objects, how comes it that we know these objects or an external world? The immediate object of perception, so far as can be appreciated, is

* Romiguere—Leçons de Philosophie.

the action of the intra-cranial focus. This action is the immediate antecedence, the perception, the sequence, the mind intermediate to the two. Experience, research can extend no farther. It is true, a movement returns back to the senses modified by the mind, but this movement is vital, since it is by living organs; and can contain nothing of the form, properties, qualities of the object, which first excited the sense or began the series. This series may be thus compendiously stated: All matter exists in nature in constant effort, motion. This motion is modified by the senses, is transmitted, modified by the intra-cranial focus; the same or a new motion of the mind itself returns to the senses; and we are instantly conscious of external, material existences.

Between this centric, eccentric movement, and this consciousness, we observe nothing in common. Cause and effect here seem to have changed their natural order, and stand out on different ground. We do not see what connects them in dependence. It is the union of the mortal with the immortal, of the diminutive of matter with the infinite of mind veiled impenetrably by creation.

The reaction of perception is returned to the irritated parenchyma of the organs or internal senses, the same as to the external; and yet the mind sees, hears, tastes, smells nothing. It only feels the molecular changes agreeable or disagreeable of these organs. It is, then, not this reaction which makes it conscious of external material existences.

Here is the Gordian knot in the science of human nature.—The mental phenomena arrange themselves on the side of a force, separate from the chemico-vital of the organic body. But, some anatomists, like some geometricians, will admit no truth, as if all the variety which exists were geometrical and anatomical, but what is demonstrable by their science; and see nothing in the intellectual acts beyond the compass of the organism and properties of matter. These anatomists, devoting their days to the science of structure in the constant and intense exercise of their senses, their minds acquire habits of seeing unfavorable to the conception of functions

without visible parts, such as the mind, and thus they rob the science of man of its most beautiful ornament.

The intra-cranial focus, common sensory, the term of all organization, living brink, to which all perception can be traced, is the deep gulf of shadows. It forms, as I may say, the great arena, where was planted early the standard of ambition. For man eternally contends with nature for the truth she conceals. The insatiable desire of knowing torments him forever.

All the knowledge of external objects depends primarily upon movements, they excite in the senses, ultimately, upon the consecutive movements of the common sensory, in which the mind distinguishes their forms, colors, properties. But these *empty movements*, which the mind sees as *colored figured substances*, are not these objects, but changes in the organs produced by them, or propagated from them. Pyrrho took refuge from the difficulty in unbelief; regarded nature and his own existence as pure illusion; and established in Greece scepticism on foundations of philosophy with charms enough to make partisans. Zeno and Xenophanes conceived all motion in matter impossible; and attributed all the changing aspects, phenomena of the world, to the illusory play of our senses. Amid his beautiful gardens, Plato beheld with a sort of ovarian life the images of all external existences in the mind, which sensation develops, and arouses to activity. Aristotle founded all in sensation, expressed in these famous words—*Nihil est intellectu quin priùs fuerit in sensu*. The profound meditations of Leibnitz did not allow him to see all the summary phenomena of the mind contained in this axiom; and he made this imperishable addition—*nisi ipse intellectus*. On top the deep-founded pile, into which Leibnitz had built the understanding, Kant raised up the colossal fabric of his system, besides profoundest thought,—remarkable for the heavy shadows, which hang about it. Locke subscribed to the axiom of Aristotle. Upon that which we perceive in sensation not being the objects, which make the impressions, Berkeley commenced, and Hume finished the

most complete system of scepticism ever offered to the world.

Like the famous conqueror of Asia, Dr. Reid arbitrarily cut the Gordian knot by asserting—*the irresistible belief of an external world on the evidence of the senses is a law of our nature*. With all the benefits of this law, Brown could not arrive at such belief; and felt himself forced to admit a sixth sense in what he calls, “the muscular frame,” as the evidence.

According to Sénateur Destutt-Tracy, all the mental phenomena are simply modifications of sensibility; and the inertia of bodies is the primary base of all their other forces, and the cause of all our knowledge of them. “Cette propriété fondamentale des corps que nous nommons force d’*inertie* est donc nécessairement la première par laquelle nous les appercevons. Elle est la base de toutes celles que nous leur connaissons et que nous joignons ensuite à celle-là pour former l’idée complète de chacun de ces êtres. Sans elle nous n’aurions pas connu les corps étrangers à nous ni même le nôtre.”*

The hand passed over a body feels resistance; and the mind concludes upon the existence of something foreign to itself, and distinct from the moving hand. The muscular sense of Brown appreciates this resistance. The value of the two hypotheses is the same. The ideas of the French philosopher are manifestly the materials from which Brown brought forth his muscular sense, and to which he paid only a silent homage.

Fenelon, whom St. Pierre calls *divine* from the great beauty of his mind, evinces, from his definition of an idea, he could not conceive the manner in which we acquire a knowledge of external things. “Mais qu’est ce qu’une idée? c’est une lumière qui est en moi, qui n’est point moi-même, qui me redresse, qui me corrige, qui m’empêche de me tromper, qui m’entraîne par son évidence, qui me frappe par sa lumière; c’est une règle qui est au dedans de moi, de laquelle je ne puis juger, par laquelle il faut au con-

traire, que je juge de tout, si je veux juger.”* This view evidently is originally from the gardens of Plato.

But to recite opinions were endless. There can be but two conditions. All our knowledge is due to the intellectual faculties stimulated by the senses; or to laws impressed upon them for the regulation of their own economy. I believe philosophy will, one day, gain greater dominion in the senses, will appreciate more closely their actuating forces; and evolve a theory of the mental operations much nearer the truth.

The theory of matter, first cause of our ideas, is infinite; capable of improvement by successive, innumerable ages of our race. The number of worlds it forms in space, whose laws to some extent can be ascertained, each of which developing some new trait in the character of the great Father of all being, or throwing out some other in bolder relief, will give to natural theology an endless flight; while the explorable surface it thus presents to contemplation, compared to the slow motion of the mind, to be travelled over, will require time not much short of absolute infinity.

The study of matter, which flings light upon the Divinity, must help likewise to show us the mind. For like the mirror, which cannot reflect its own image, the mind, which sees every thing beside, cannot turn the light back upon itself, and contemplate its own nature. The only means, therefore, it has at command of perfecting its own science, is in the improvement of the theory of the peculiar mechanism of each sense and of their stimulating forces. And since these forces may be polar, and the manner of the action of the nerves, or of the subtile fluid which fills them, vehicle of the transmission of impressions to the common sensory, is most evidently polar, all the discoveries made in the laws of the imponderable attractions must become so many materials for this improvement. It may be fearlessly laid down—the mind will know itself only in proportion as it may detect the true nature of the material and organic conditions which impel to its activity. And here, as re-

* Œuvres Philosoph.

spects the latter, the prospect is every way gloomy. Nature has limited the power of zootomy to most nothing; and many of its truths are doubtful. Could it tear from the brain and conducting nerves their coverings, cut fasciculus by fasciculus, piece by piece, and observe the order of phenomena, it might detect the use of each part; the precise circumstances of the organic-mental movement going to the brain and returning back to the senses; and, by changes in bodies applied manifesting polarity, to the mass of existing evidence, might add its testimony confirming beyond doubt this movement to be polar.

But such examination is not borne. Like Homer's storm-footed Iris, life retires instantly, or falls into dysnomy; and truth caught at such moments is unfit to rely upon for science. Descartes made imaginary dissections of the mind. He supposed the abolition of the senses, and then sought what it might be in its pure abstraction. But mind without senses is unphysical, unsearchable. Deeper research into the laws of matter and of vitality will improve the theory of the mind, but never solve completely the problem of our immortality. For if we knew all the relations, agencies of matter and organization, we could then only distinguish the sort in action, but not the sort in mind, which receives it.

ELEMENTS

Of the theory of our knowledge and belief of an external world.

I have laid down—the mind can never contemplate itself an isolated, solitary force in the universe, and advance in the light, or reflect the light back upon itself—that it is the mechanical mind alone—mind, an element in the great system of reciprocal forces of the world—mind, a branch of natural history, which is susceptible of investigation and improvement. What is the narrowest ground on which we can place its reciprocal action as to what is external, or our knowledge and belief of a material world?

The reaction of perception reverberates alike to the external and internal senses—to the irritated parenchyma of the

organs as to the irritated organs of the particular senses. And the molecular, chemico-vital movement, which, from the embryo to the term of life, presides over, conducts in all the changes of the organs, stimulates to sensation equally with the motion of the external world. In these two respects all are equal. In parenchymatous sensation, we perceive nothing colored, extended; the sensation is simply agreeable or disagreeable, as in health and disease, or manifests the wants. In sensation by the external senses, we perceive objects colored, extended, having many properties, qualities, to which we give names, defining them. In these two respects all are unequal. The reaction of the central organ on the irritated sense, which completes sensation, is alike in all; and therefore, cannot cause this inequality or difference.

What can we discover unequal to account for this difference? All the nerves of the internal senses, those immersed in the midst of the organs, so far as anatomy can trace, are simple in their terminations. But all those of the external senses have, as we have seen, peripheric terminations peculiar, inspiring the idea of designs separate from all other nerves, with ancillary apparatuses, and ganglia on their roots to help out these designs. The motions of the organism and of the external world are the exciting causes of all sensation. The difference in the nerves, the difference in the exciting causes, must, therefore, circumscribe the ground of our consciousness and belief of a material world.

Each sense furnishes the intelligence of something distinct. All sensations are special in relation to the senses, and depend upon specific exciting causes. Thus, the causes of vision, olfaction, and audition, immerse the whole body, and stimulate only the senses in relation. The molecular movement, which excites hunger, thirst, &c., since all parts of the body are nourished, must be present everywhere, yet these sensations are only felt in particular organs. The causes of all sensations, then, are limited in the sphere of their activity—limited, as we may justly suppose, in the provisions of the living economy. And we may think, were

more of the nerves armed analogously to those of the external senses, we should instantly enjoy perceptions new and unknown before—that such a change would immediately transform the universe and ourselves into spectacles so novel, we should not be able to recognize what we before knew and ourselves in the altered relations we would be presented.

There are reasons to justify the belief, that the mechanism of activity of all the external senses, is the same, or analogous. In vision, the rays from any object form in the eye a luminous cone, which paints as opticians know, the picture of the object invertedly on the retina, the immediate seat of the specific sensibility of the organ. The painting of the picture is all that is due to the object in the subsequent perception. May we not look upon this picture, as containing the true secret of the mechanism of all the other external sensations—as the algebraist does upon his x , by which he may discover the unknown value of other quantities?

In sketching these senses, I noticed they were all reduced to one condition; that all their nerves arose with ganglia; that all the terminating extremities of these nerves might be considered only as so many variform papillæ or retinæ; and that all the forms of matter, which immediately stimulated them, very probably were æriform or gaseous, and analogous to light—similar in their habitudes, and mode of activity.

Why, then, may they not be analogous in the mechanism of their functions? Does nature agitate Jupiter in his orbit by one motion, Saturn, by another? or rather, does she not supply all her roving progeny above, however may vary the ellipticity of the curves, wild the solitudes they traverse, from the same, simple, exhaustless source of motion? It is the same nature which constructed the senses for activity. Should we not follow her simple ways, her easy analogies,—copy them in giving shape to our philosophy? and we may not believe, in the eye she has one mechanism, by which we see an object; in the touch another, by which we feel it, *et cet.*; but, that the mechanism of all these senses are the modifications of the same perfect model.

The property or quality of this mechanism, which permits the light to paint the picture on the retina, may be considered the characteristic of this model in all. External objects, therefore, produce a modification in each of these senses analogous to the picture on the retina, which conspires to the same end in seeing, feeling—in all this sort of sensation. This end is consciousness in the mind of the external, independent existence of the objects. In order that this modification take place on the stimulations of bodies, the nerves are expanded in different ways in the immediate seats of the senses, which makes them differ so much there from any other part of their course.

The reason, final cause, then, of these expansions, is this modification. We behold it only in one of its forms in the retinal picture. We cannot know what it may be in the other organs. But since they all furnish some intelligence of an external world, we must infer its absolute existence in all. The functions they perform vindicate their right to it. The effects are similar, the producing causes must be similar. It is through these pictorial representations impressed, imprinted by matter, observable only in one form on the retina, that the movements of impressions empty, shadowy, passed to the panoptic centre, become clothed with form and solid, extended substance. But right here cause and effect, as I have noticed, occupy strange relations, and arrest abruptly the flight of reason and research.

We see sometimes, in anomalous distribution, the sprig of a voluntary nerve passes to the ear, or other such parts, and subjects them to the power of volition. Cases very respectably reported exist now of persons, who have beheld in themselves intestinal worms, their own viscera, and marked accurately the progress and appearance of disease in them. Can the plastic power of inflammation develop papillæ? or are the nerves supplying these viscera, in some extremely rare cases, armed with anomalous papillæ, on which the viscera impress the pictorial representation of which I have spoken; and thus subject them to the empire of the external senses, as anomalous voluntary nerves subject parts not volun-

tary to volition? Who shall be able to demonstrate this true, will establish the fundamental principles of this theory.*

SECTION III.

EXTERNAL PERCEPTIONS OF PARTICULAR ORGANS, SIGHT, TOUCH, ETC.

SIGHT is the amplest, noblest of the senses, since by it the mind enjoys the greatest freedom, asserts its empire over the universe; and light, which stimulates it, reigns universally a present, governing force.

Since the revival of learning in Europe, from their high rank, light and vision have enjoyed a monopoly in the studies of most all ranks of philosophers. Pretty early, two great geniuses, Newton and Descartes, of two great nations, rivals in sciences as in the arts of war, evolved their theories on light.—The one, that it consists in exceedingly minute particles propagated in straight lines from luminous bodies; the other, that it is an invisible fluid existing everywhere, but requires to be agitated to produce its effects. On each side pretty generally philosophers arranged themselves for experimental investigation, among whom were Euler, Grimaldi, Mairan, Melville, Biot, Wollaston, Barrow, Molyneux, Mitchell, Wallis, Hooke, Bouguèr, Priestley.

If knowledge sprang up in the inquiry, darkness sprang up also. Both theories presented insuperable difficulties; the scale turned in favor of Newton's. With all the acknowledged succor of geometry, we cannot know light—light! the beauty, glory of the world—minister of life expanding, diffusing everywhere—modified by all substances, greedily drunk up by all—its everlasting torrent raging

* Would it not be desirable, the bodies of all such persons, if any there really be, endowed with this preternatural vision, should be subjected to the autopsy of able anatomists, such as Tiedemann, Meckle?—Is it not possible, these misplaced papillæ, or the organic modifications, by which these viscera represent themselves in the intra-cranial mirror and find access to the mind, might be detected? Powerful microscopes might be employed with advantage.

onward, the supplying fountain remaining the same through the waste of all ages—a few particles falling on the eye presenting the boundless scene of nature.—The ingenious, laborious experiments of Dalton, Mitchell, with the most powerful lenses, the arguments, and conclusions of Priestley on those of the latter, serve to evince scarcely any materiality in light. Supposing the sun to be of the density of water, Priestley, however, reasoned out by his dim torches, that 670lbs. of his substance given off, would illuminate the universe for 6000 years. But what are such calculations but mere mathematical conjectures?

Whatever, however, be the nature, we know light in its course is modified both by the atmosphere, and the objects which transmit it to the eye in vision. The various colors with which bodies are clothed, are proof of the changes, they effect in it. And it is very probable, the quantity required for vision is inconceivably small. The experiments of M. D'Arcy prove its impression remains on the retina two minutes and forty seconds. Since the luminous particles would move in this time 32,000,000 miles, it follows, that constant vision would be kept up by particles moving 32,000,000 miles from one another. Nature too only allows the use of a limited portion in vision, since the amount is constantly regulated by the action of the pupil.

When, therefore, we consider the gross volume and weight of the retina, compared to the extreme smallness of the quantity, the great tenuity, almost incorporeal nature of light, the theory of impressions by vibration, shock, mechanical impulsions, becomes imaginary, untenable. Each of these modes of motion necessitates in the cause the property of impenetrable extension, which cannot be proved to exist in light. Indeed, the sort of body this substance forms, savors but very little of common materiality. And, under such views, if we admit the neologism, rather neoplatonism, of Kœnisberg, Shelling—their school of famous philosophy—where shall we find in light the cause and the proof of the copious oxydations, and other chemical changes in the

retina and nervous organ, in which they make the sensation of vision to consist.

The light paints the retina; the whole structure, except the pupil, appears to be perfectly passive. In the painting a change occurs initial to perception. This change, since the mind's act follows to which it is initial, we may conceive to consist in a movement imparted by the luminous molecules painting to the molecules of the peculiar substance secreted by the nervous pulp, which forms as already an atmosphere about this sense, as about the seats of all the other external senses. The painting molecules, or the light is modified by the objects reflecting it. This modification appears to form the only relation between the visual organs, and the objects affecting them; and constitutes the foundation of the individuality of their perceptions, or the mind's means of identifying them.

All experiments show, it is not the surface of bodies, which immediately reflects the incident rays, but that the reflection is inductively due to a subtile, æriform, igniform substance, which saturates, forms about them atmospheres, operative only at a very small distance. All the bodies of nature appear to hold a quantity of this substance proportional to their specific capacities, which displays its effects when this specific capacity or equilibrium is disturbed, as in the action of the magnet, voltaic pile, combustion, the electric machine.

From the rapid modifications of sensibility by stimuli, and the phenomena of the action of the nerves, we have seen likewise the highest evidence, that a fluid not less æriform fills them, and envelops the immediate seats of all the external senses. These two substances—the one saturating, covering the surface of all bodies, the other enveloping all the organs of these senses—may be regarded as reciprocally active in all their perceptions. Two substances, therefore, of amazing exility—the one existing in definite proportions in all bodies, the probable cause of all their revolutions in space, of all their changes of form; the other evolved by the nervous structure in assimilation, operative in all living

changes, phenomena—appear to be immediately concerned in all the intercourse of our intelligence with the outward universe. The former, which immediately, as we have seen, reflects the light in vision, operates, we may think, itself—a kindred substance—in achieving all the other sensations of smell, touch, taste and hearing. And since it is active only at a small distance, hence the contact of bodies directly or by intervention, is indispensable in all these sensations.

Accordingly, then, to these views, the organs of sense brought in contact with bodies, disturb the equilibrium of this subtile substance they hold. A reciprocal movement is thus excited in the tenuous substance accumulated about the senses, which ends in perception. In this movement, bodies impress their images or what answers the end of images on all the organs. In vision they effect their representations by the aid of light; in all the other senses, by the aid of the imponderable substance or substances they hold, which, when agitated, become light, heat, motion, evincing they belong to the order of corporeal modifications, of which the solar rays form one. If, therefore, through these rays, bodies paint their images, make their representative impressions on the retina, through substances similar to light, they make these same impressions on all the other external senses—condition, as I have said, of our knowledge of their forms, qualities, properties.

Conformably, if we suppose the nerves of our senses terminated without expansions or modifications of structure to receive the representative impressions, in the action of all external objects, we should have perceived none of their forms or qualities, had no need of language in relation to them, and been presented with sensations simply agreeable or disagreeable, which we should have referred to some internal source. As regards the manner of this action itself, or of the action, by which objects excite perceptions, all the phenomena, all the facts above cited, indicate it to resemble that, by which the sun excites motion in the planets, which is always in two opposite directions or polar. And as to the senses, we may look upon them as so many mirrors sus-

pended round the soul on the body's exterior, reflecting the images of perceptible things, through which, when impressed, it looks out in its reaction on the universe.

The ideas, then, of figure, magnitude, time, distance, space, cannot be due to any one sense. Several of them must combine to furnish the separate elements. The field all such ideas occupy, with the weakness inseparable from human meditation, has been passed over with various success by Locke, Condillac, Reid, Berkeley, as well as by other systematic and monographic writers of the actual epoch, to whom we abandon their subject.

From the developments of this section, it is manifest—that, since no bodies in nature act directly on our senses, or exert any influence upon them, except through the reflected rays of light, and the imponderable substances they hold, it follows,—*we only know matter as the remote cause of our ideas*. And, since all perception is motion, and pure intelligence or perception without manifesting organs,—without motion, is wholly inconceivable—the weight, density, smoothness, roughness, all the properties and qualities of bodies, must be to us simply what our sensations make them. What they may be over and above, or in themselves, we cannot know. M. Destutt-Tracy saw the truth :—“ Were we either wholly spiritual or material, we could not know matter.” Being material, in the action of the senses, of the nervo-cephalic focus, we have the material elements of sensation ; spiritual, we have in the action of the mind, sensation.

These vital movements of our material organization hold in their subordinating union our spirit. They were instituted by the veracious Creator. They are his reports to our intelligence of an ambient world of matter ; and our nature urges us to believe, rely on the evidence, though we cannot profound the law on which the truth itself rests.

SECTION IV.

PERCEPTIONS OF THE INTERNAL SENSES.

THROUGH the class of perceptions just reviewed, the senses to which they correspond, located on the exterior of the body, help to sustain it in constant and suitable relation with external objects. These perceptions themselves are only modifications of the mind produced by these objects. We directly feel, know them. They constitute all these objects are to us. And the mind, by a law of its nature, indirectly or through its perceptions, is conscious of the presence of the objects stimulating the senses.

What the objects are in themselves, or over and beyond what the intelligence furnished by their stimulations, make them to us, I have said, we cannot know. From the great and persevering imperfection of the physical sciences, it is highly probable, matter remains principally unknown, unknowable,—that our actual knowledge of it, the knowledge of which is mainly the measure of all arts, civilization, is comparatively nothing. Indeed, it would appear from the constitution of the world, and the universal psychology of animated beings, no more knowledge is admitted or given than is necessitated by the conservation and comfort of life in all the species.

Were our minds by the exertion of innate power, capable of spontaneous perceptions, or perceptions independently of corporeal impressions, then we should behold around us the Berkeleyan or ideal world of matter. This world enjoying existence only in our perceptions, would be purely phantasmatic. But since all external perceptions commence in the senses by the arbitrary stimulations of matter; and are developed according to the order of nature, and not according to a pre-established order in the mind itself, as some philosophers have supposed, there can exist no normal spontaneity of perception. And, since in the reaction of all such perceptions, the mind is as conscious of external, material existences in the senses, as it is of the acts by which it perceives them, the material world can but be real and not ideal.

The occasional apprehension, or seeing of ghosts—apparitions, in which the common sensory loses equilibrium, and the mind reacts upon the sense of sight without its being impressed, the same as in common vision, cannot affect this argument. For all such apprehensions are aberrations from the natural order, and the spontaneity of perception, abnormal.

It is obvious the welfare, conservation of our existence is predicated upon the intercourse of the objects by which we are surrounded. We live amid their excitements and influences, which tend equally to death as to life. If in respiration the air vivifies, it poisons by its miasma. If the zephyr refreshes, the tempest dashes to pieces. The same sun which warms, will burn. The road we travel lies over the precipice, as over the even plain. The forces we are now expending result from the food taken at the hour past; it is wasting by all the absorptions and excretions, and must be resupplied at the hour coming, for the fountain of life does not flow of itself, but is elicited forth by the intercourse of these objects. They aliment our being; are its *materials in reserve*; and require to be regularly dosed, apportioned out, to meet our continual wants. Nature achieves this apportionment by endowing them with properties to *arbitrarily* stimulate the senses, and cause perceptions. The mind, in its turn, reacts upon the senses they stimulate, and is assured of their presence. It appreciates their influences, and exercises its motive power on the organism accordingly, to secure the good, and avoid the evil, to which end volition was given. If, therefore, accordingly, the perceptions of sensitive beings were spontaneous and illusory, their existence, for a moment, in a world of such active forces as ours, were impracticable, impossible. Their existence is absolute demonstration, that the cause of our external perceptions, or matter, is real being, to which the senses are the measure of knowledge. But let us pass from the review, and deductions of the two preceding sections, to the internal senses and their perceptions.

By these we are apprised of our wants, or of the relations of our organs with the external materials of their composition—with all that is needful to them. They are, therefore,

equally with those of the external senses, the safeguards of the economy. They excite the will, and expend a large amount of its action in the achievement of their demands.

Truth refusing the noble mind of Locke, revealed herself to Cabanis.* The internal senses are a source of perceptions to the mind, through which the action of the achieving will takes place—there are innate ideas. “Cette philosophie,” says Madame de Staël, (the philosophy which makes the external senses the only source of ideas,) “livre l’entendement humain à l’empire des objets extérieurs.—L’immortalité,” continues the illustrious daughter of Necker, “de l’ame et le sentiment du devoir, sont des suppositions tant à fait gratuites dans le système qui fonde toutes nos idées sur nos sensations; car nulle sensation ne nous révèle l’immortalité de l’ame dans la mort.”

Had Locke known these senses, he would not have refused instinct to man. Founding himself, as he did, on the fundamental ideas of Aristotle, which, for so many ages, had been fostered in the bosom of the church protected by the powerful ægis of religious fanaticism, and ecclesiastical authority, his mind could not contemplate their philosophy. He could only see ideas as the offspring of the external senses. Time had reserved for the triumphant logic of M. de la Romiguere, a signal victory—the glory of extinguishing forever the impure light—the colossal ideas emanated from the Lyceum of Aristotle, which had usurped the empire of human intelligence, and, for so many centuries, swayed over it the sceptre of the most absolute despotism.

Another step has been made; there exists really the *homo duplex*. The understanding is not limited to the sole dominion of external objects. Through his external senses, man beholds the universe, amid which he is placed to exist. He sees himself through his internal senses as connected with it, and appreciates his conservative relations. It is through these senses he becomes interested. Accordingly, an individual with the external senses only, if such were possible, would be an idle and disinterested spectator. These

* Vid. Rapports.

senses would intimate to him the simple existence of things. These things would be connected with him only through his bare intelligence, not through his organization. They could excite nor like nor dislike, pleasure nor pain, joy nor sorrow. He could neither know good nor evil, be moral nor religious; but would enjoy a perfect amnesty, seclusion from all emotion. The rage of war, the calm of peace; the star-lit, blue-topt mountain, the fierce volcano; the sound of the flute, the noise of the hurricane; the bride at the nuptial altar, or at the martyr's stake; the presence of the dark-haired, blushing beauty or the statue which represents her, were to him alike.

Among the elements of our being, these senses must make up a considerable portion. They give to it its coloring. Between our organic existence, and that outside of us, they form the bond of union and reciprocal activity. The ganglionic nervous system appears to be the great instrument through which their actions are principally expressed; for without the nervous substance, the mind does not come forth in action, or modify its phenomena. This system has many connections with the cerebro-spinal. Thus man anatomically is articulated with himself internally; and enjoys with nature externally a double union. 1. He knows things; 2. he calculates with some certainty, knows them with their value to himself.

Every molecule of the organic whole exists constantly in the sphere, and recognizes this system as the source of its animation. This system, the right arm of universal organization, prescribes the laws to nutrition, or conducts in the chemico-vital movement. It is by its fiat there are bone, tendon, muscle—a diversity of animalific tissues. The persevering identity of the living forms of the same species, is evidence, the law-making power intrusted to it at creation has not been violated. The outward world is the great store-house, whence are derived the materials upon which it exercises its transforming power. It fashions many of the tissues with the names, as I may say, of the things it wants from this store-house, written upon them.

Like Newton, Broussais reached nature in demonstration, at the end of a long line of thought extending back through ages. He added a single atom of thought to the end of this line. "All the internal surfaces are surfaces of relation." They are surfaces on which burn the flame of desire. This desire is the expression of the senses of which they are the seats. Through the encephalo-spinal nerves, with which some of them are partially supplied, or the ganglionic nervous centre, and its connections, this desire is transmitted to the brain. The brain irritated, the mind feels or perceives the condition of the tissues or wants of the economy. Thus the internal organs, through the arrangement of their nerves, can transmit the impressions originated in their changes to the common sensory, and cause perceptions, ideas in the mind.

The external senses, I may say, perceive all objects indiscriminately alike. The internal senses distinguish between them; make a choice; solicit or repel. The mind's reaction upon an outward impression received in the brain, is radiated or passes back to the sense impressed, and the object is then felt. The same reaction synchronously is transmitted by the nerves to the seats of the internal senses; the object is then felt or perceived in relation to the economy. The mind thus perceiving by the internal as by the external senses, orders the acts of volition accordingly as the object may be desirable or repellable. In this manner is achieved all alimentation, and a due relation maintained between the living organic and anorganic bodies of nature.

The external supporters continually vary the intensity of their action on living bodies, which as continually require new adjustments in relation to them. In their formative action, these bodies constantly waste their substance, which as constantly needs to be resupplied. The internal senses, through the nerves, which preside over this action, gain access to the auditory of the common sensory, and speak out their wants vocally to the mind—secure the proper adjustments to the supporters, and the repairing materials.

Equally with the external senses, therefore, they are kept, during the hours of wakefulness, in incessant activity.

Thus the wants of animals necessitate for them a prodigious intercourse of their world. The support they need from it, the amounts they organize, make it every thing to them. In its incessant, innumerable stimulations, they experience a certain amount of good and evil. In these two respects man far excels. And though he be the most dainty, the most repulsive in his appetites—a fleeting shadow—a phantom in the abyss of time, on his passage to the natural grave, as may be calculated from the statistic tables of Santorius, he receives about 100,000 pounds of its substance, which he organizes, and returns. What a prodigious amount of matter to combine in one life, brought together through the agency of internal sensations! and how great the internal nervous force to effect such combination! In its operations by the internal, by all the senses, the mind shows itself the flambeau of nature, which lights the footsteps of animals, through the different routes of existence.

SECTION V.

PATHOLOGICAL SENSATIONS.

THESE, as their name imports, are only developed in the deviations of the organism from health. The mind refers them to the seats of the primary irritation, the same as all other sensations. Hence, as I have said, these seats are entitled to the name of senses.

Some physicians estimate the deviations from health in civilized man, at about 1200—ample, rich heritage of mortality. The number admitted by the nosologists is sufficiently great, as is manifest from the tables of Linnæus, Sauvages, Cullen, Vogel, Sagar, Pinel.—However few or many may be the distinct affections of the organs constituting disease, we know they all modify the mind. This class of perceptions or sensations, therefore, comprehends all between the simple feeling of uneasiness and the pain of death; and

constitutes a respectable portion of the mental phenomena. In high stimulations, enteritis, chronic irritations of the chylopoietic viscera, slow organic wastings from the passions, deliria of fevers, cephalitis, all the neuralgias, various species of insanity, spectral illusions, somnambulism, animal magnetism, et cet. these sensations are modified almost to infinity, presenting the mind with many distinct phases. To write their history would be a great labor for one man; we will only notice a few of them with some reflections.

ARTICLE I.

In Somnambulism.

From *somnambulismus*, *somnus* sleep, and *ambulo* I walk. This curious, mysterious affection of the sensitive system has been known from all antiquity. Aristotle, Galen, Diogenes Laertius, Fracastor, Schenchiuss, a number of writers of all epochs, have spoken of it. Galen himself was attacked by it. The affection exists; I will in preference give a recent example of it.

The S. family were disposed to enjoy their friends in a social way. At the hour appointed, the invited guests poured in; and, amid this elegant and fashionable assemblage, the moments passed gaily on until near 1 o'clock at night, when it was expected to retire. At this moment they were occupying their seats, the noise of the music and the dance having just ceased, when the door suddenly opened; the figure of a female *s'habillée robe de chambre* entered, advanced, and stood motionless near the centre of the room. The bright lights burning showed the features cold, white, immovable, with some distortion, the eyes nearly closed. The hair voluminous, of radiant black, fell loose far down over the shoulders, heightening much the color it shaded. The limbs were all motionless as a statue, some appearances of blood disfiguring the lower extremities. With some alterations the figure might have been taken for one of Diana's train just returned from the rugged chase of Ida.—*Spumantes apri cursum clamore prementem—hic errantem, dederatq comam diffundere ventis, nuda genu.*

All eyes were instantly fixed on the apparition. There it stood, the form a fair model of loveliest humanity, but the appearance, any thing beside. The features by the brightness of the light, and shade of the hair, showed in unearthly transparency, inspiring the sensation strongly of a visitress from another sphere.

The faces of the sensitives turned pale, and they rushed away from the room with the shriek of terror. Their gay and assiduous attendants smit with the sight, precipitated after them, to support them in their alarm, escaping from the behests of this unwelcome messenger from the dreamy land. Soon Col. S. discovered himself standing alone, gazing steadfastly on the apparition, which had entered his house. His daughter, Miss S. recovering a little, having discovered her father was still within, returned directly to the side of the partition door to venture another glance; when she exclaimed wildly, "Oh! it is the features of cousin Caroline; she is dead, and they have not had time to let us know."

In those beautiful features veiled by demon power, Miss S. alone could discover the imprints, faint gleamings of the pure spirit, whose sweet love was another life in her. Emboldened by this discovery, she darted into the room, and arranging herself behind her father, urged him to approach, reiterating, in the most tender and endearing accents, "Caroline, oh! Caroline!" The cries of Miss S. produced no effect on the apparition; it continued still motionless, immovable. Her father approached, and grasped it firmly by the shoulders; still no change ensued. The touch was nearly that of ice. Miss S., convinced of the manifestations of flesh and blood, with him shook the apparition violently with much noise and agitation. The eyes then began to vibrate rapidly, a sort of shivering or convulsive movement was manifest in the whole body. These momentary symptoms giving way, Caroline opened her eyes, and was instantly convicted of her true situation, but perfectly unconscious of the causes which had led to it.

Circumstances.—Besides being relations, Miss S. and

Caroline had received the same amiable nature. Educated in the same school, they had been friends from early infancy; and were in the habit of spending much time with each other. Their homes were about two miles apart; a private foot-way lay between, which they were accustomed to go when visiting. This foot-way crossed a creek; there was a good passage over the rocks in common flood. Above, at some distance, lay a log from bank to bank, high above the water, the passage when the stream was up, but neither ever had courage to cross it at any time. The path in many places was precipitous and rugged.

The day preceding the party, an immense amount of rain had fallen, which now had greatly swollen the stream foaming down its rocky channel. The night of the party was cloudy and pitchy dark. It was one among the first foggy storms of Autumn.

History.—Shortly before the festival night, Caroline labored under some slight menstrual irritation; so that when the time came, she concluded not to attend. Earlier than accustomed, she retired to repose, with her mind full of the ideas of the gay friends she had expected to meet, and of the scene of the festival.

Her mother recollected to have heard some noise in her chamber about midnight. It was then she rose, passed out at her door, and plunged into the dark. She took the nearest route; traversed her father's field in a straight line without a path; crossed over the fence; and fell into the road. Arrived at the stream, she took the detour to the log; passed over the flood raging at her feet; continued in the path-way; and entered the door of the party, as I have described. When light came, the traces of her feet plainly showed the way she had travelled.

Shakspeare has managed somnambulism to prodigious effect in *Macbeth*. Than the one however here given, of all the recorded cases now before me, none more precisely displays the mental phenomena. A scientific history of somnambulism, with a good digest of cases, would present medical humanity alive in the shadowy land; constitute it a

separate branch of anthropology ; and, in interest and incident, rival with reality the fancies of Homer, Ossian, Maro, Scott—of all the unmerciful freezers of human blood.

ARTICLE II.

In Mesmerism or Animal Magnetism.

What shall we say ? Cuvier* admits phenomena in living bodies of this sort of attraction. Lobstein† avows his full belief in its existence. Georget‡ with others hold it on the ground of observation and experiment—an affair of the senses—and evolve its laws and operations in the form of absolute science. Others of equally brilliant name, in the actual epoch, wholly incredulous, denounce it as proud, hateful charlatanry, the imposition of designing men upon the credulity of the weak and illiterate. The faculty of Paris, we know,§ among whom our Franklin sat in judgment, after laying themselves open to full conviction, and a fair investigation, condemned it as ideal, and a contemptible forgery upon mankind.

We have only room to say—some knowledge of this magnetism appears to remount to a great antiquity. It is one of those sort of ideas moving in the mind's extreme ellipse, which, after making its aphelion like some of the stars, returns with its glare in the desolations of time to agitate the philosophical world.

As a remedy in *rheumatism, paralysis, &c.*, the magnetic fluid was known to Ludwig, Lacondamine, Sigaud de Lafond, Glaubrecht, Aken, Paulian, Weber, Stromer.—By Paracelsus it was extolled in *odontalgia*, and other *neuroses*. P. Hehl, astronomical professor at Vienna, explored its therapeutic virtues in other diseases ; and communicated his observations and discoveries to Mesmer. Desperate for immortality, gloomy, ambitious, spiritual like Mahomet,

* Anatomie Comp.

† Treat. on the Symp. Nerve, p. 101.

‡ De la Phys. du Syst. Nerv., tom. i. p. 267.

§ Vid. Ency. Britannica—words Mesmer and Mesmerism.

but without his love of the sword, Mesmer pushed on in the route of investigation, with the chart and compass of the Vienna professor in hand.

Soon he placed the knowledge he had received to good account; claimed faultily and unjustly the first principles of it in a former publication of his; and at the disapprobation and displeasure of Dr. Ingenhouz, besides many others, succeeded in fixing on his own head, the glory of what he considered an everlasting discovery.

According to Mesmer, as developed by his disciple Deslong, "*Animal magnetism* is a fluid existing universally in nature," medium of all the celestial attractions; and operative, despite of distance, between bodies both mineral and organic, and *vice versa*.

The existence of this animal, magnetic fluid was denounced by the literati of the age as visionary and unfounded. Mesmer appeared before the Academy of Sciences at Berlin, for the protection of his principles, but they were rejected as unworthy of notice. They were no better received at Vienna.

Not to be repulsed from the altar at which he worshipped, Mesmer made other efforts. Year 1778, he was joyfully welcomed in Paris by the thousands starving there, as in all other great capitals, with ennui, whose existence, to be supportable, must be solaced with novelties—*ennui*, which arms with force the genius and pen of romance and novel composition, whose products it consumes with insatiable greediness. Here, amid the loud clamor of fame, his system continued to rise with augmenting splendor, until the French sovereign ordered him to appear before his learned men, by whom he was again condemned. The report by M. Thouret of the judgment the Royal Society of Medicine passed upon him made public, struck dumb the host of magnetizers then in Paris; and knocked from their unconsecrated hands their most lucrative trade.*

Still in shape more or less modified, animal magnetism lives, and finds favor among some of the great and powerful

* Deslong had amassed himself more than £100,000.

in thought. Lobstein, I have mentioned, conceives this magnetism properly investigated, might yield its illumination to physiology, and conduct to new knowledge in the science of living beings. He does not think, "the existence of occult powers," animal magnetism, "in human nature, declared by observation, should be rejected." In confirmation, he cites the case of a young female communicated to him, in which, as to the facts, there could exist no doubt. "Some letters, folded and sealed as they came, were placed without her knowledge, upon the *scrobiculus cordis*, in which situation she discovered their contents" while sleeping—effect of occult powers. The phenomena of the magnetic slumber recorded by authors are every way wonderful.

Le Docteur Georget mentions similar cases;* and, among some, one singular enough. "A lady discovered a worm several inches in length, which had penetrated one of her viscera; on each side were a number of yellow spots, and a streak on the forehead. She made an accurate drawing, and requested at her death the copy and the original should be compared." Her autopsy proved the correctness of the drawing.

In Germany, I believe, this magnetic attraction is much employed, at least, by some of the practitioners, in the cure of disease. We know Hahnemann and his sectateurs highly extol its virtues. In the *Organon de l'art de guérir*, basis of homœopathic medicine, the indications and manner of application are accurately enough pointed out. The hand is to be passed slowly and carefully along the spine, *a capite ad pedem, pede ad caput*, so as to strike the magnetic currents.

For the successful experimenting upon animal magnetism, Georget, physician to the Hospital Salpêtrière just cited, lays down carefully all the rules and precautions necessary to be observed. His operations appear to succeed with about the same success as those of a good chemist.

Under his directions, I caused many trials to be made by persons, and on persons of every variety of temperament, but not the slightest effect could be produced. Among the

* In the work quoted above.

number submitted to experimentation, the magnetic poles ought to have been favorably disposed in some. It may, I think, be fairly concluded, the *reality* people of my country cannot be magnetized. I ought, however, to say, the subjects of all these experiments were healthy. Had they been worn down by chagrin and the weight of sorrow, I know not what the results might have been.

Under such circumstances, often the imagination appears to obey new laws, and operate with more energetic power. In the world formed by disease, there is much of our humanity that remains in the first darkness:—There is a host of organic and mental phenomena, which admit of no satisfactory elucidation by any known law; and some even, which transcend the flight of all reasonable conjecture. These phenomena must appertain to known facts badly interpreted, or to occult powers, laws of the organism, which remain yet to be explored. Since the nervous system, upon which they depend in causation, appears to be subjected to the polar form of motion, may not then animal magnetism stir abroad visibly in this world of disease? and, in the actual state of knowledge, may not the phenomena in question, at least some of them, have some claim to be magnetic?

Upon this view of the subject, it is reasonable, the mind must become affected from the morbid magnetic deviations of the nervous organ. Persons laboring under such affections, toward which actual science leans, have, all ages, become puzzles to their acquaintances; and some, stumbling-blocks to the world. The somnambulistic visions—*visions of the magnetic slumber*, as I may say, then, of the honorable E. Swedenborg, well known to the public, have, at once, amused and astonished mankind. In his voluminous works on Heaven, Hell, and Science of the angels, he feels himself actually present in all he hears, converses, sees, and describes. No philosopher ought to doubt his sincerity.* In our reflec-

* His *Regnum Minerale*, among his early writings, bears no traces of this sort of delusion; and was an acceptable present to the universities. Dr. Hartley, in his *Treat. on Man*, bestows on him the praise of the greatest learning and abilities.

tions presently upon all these anomalous sensations, I shall mention some phenomena in animals resembling the magnetic, if magnetic they really be.

ARTICLE III.

In chronic encephalitis.

Since the encephalon is the laboring instrument, the mind must feel promptly its diseases. This organ attacked by moderate inflammation, the mind lavishes its strength; burns as in a hot fire. Life wasting under its slow phlegmasia, the mental phenomena become dyed deep with many different shades, which distinguish them. Sometimes the general sensibility and acuteness of sensation are exalted to excite wonder; and the mind everywhere is pushed out beyond its normal action into the border of insanity. From this phlegmasia favorably disposed, history records some instances, in which geometers have solved problems, poets have drunk inspiration, and reached fame, which they could not without. Under such circumstances, it widens and deepens the sea of the mind; and rolls the maddened billows of thought ashore flashing light and fire. Sometimes the mind's sensations and ideas lose all their coaptations with things, and the mind plunges black insanity. And sometimes, this inflammation appears to effect a revolution in the order of the brain's polar or magnetic action, and the mind falls into the visions of somnambulism, and perceives with new senses what is both visible and invisible in any other condition of the organ. I will give an example of this phlegmasia, in which many of these phenomena were manifested.

Mrs. D., wasting from it in the flower of her life, one day remarked—"Can a person live in two worlds at the same time? My sensations are so peculiar, they mock all I have learned from past experience. They belong to the objects of the world to which I go. I have been thinking over all the works I've read on the formation of language, to see if I could find any form of words, which would express them; but none will answer. They are unutterable; I appear

instantaneously to pass from one state of existence to the other. I always know which I am in by the form of my thoughts. And, too, my sensations of late have become so exquisite. As I see things, I hear sounds no mortal ever heard. I am mortal only by fits and starts; my mortal and immortal give place to each other; my being staggers to its change amid sounds. The world, in the stillest moments, is full of sounds of matter, of eternity.—O! could you hear as I do the music of heaven, and the utterance of distinct praise—see under yon snowy roof as I, the crowns reserved for the faithful in Christ, whose splendors fall on me—

“Till recently I never had the use of my senses; and yet often they are not my proper senses—but I see with both. My senses which belong here have become troublesome. I cannot even sustain the flies passing over my bed, and lighting on the curtains; the thunder and roaring of their wings distract me.” Saying herself the thing was incredible, she submitted with a smile to have her head covered up for experiment. Some few were forced near her bed, and occasionally one passed over. In this situation, she would announce their approach, and the direction of their flight—could tell, she said, “by the flapping of their wings.”

Shortly after, she frequently heard the angels calling her; saw them in her chamber, and, in the manner of Tasso, held conversations with them. These conversations were perfectly rational in every thing, except the supposed presence. When they delayed their coming too long, she would go to the window, and call them the most woingly. Soon her brain crushed, and her mind suspended its action, some time before the breath left her.

ARTICLE IV.

In apparitions.

From *apparère* to appear. As phenomena of the mind, they must enjoy existence. Mr. D., a prudent man, in the afternoon of a beautiful autumnal day, was passing near an aged cedar which stood alone in the field. Suddenly under

the shade, he discovered a human figure standing upright in the sepulchral dress. The visage was that of his wife he had lost many years since. He looked intently upon it, but it disappeared on his approach.

The story of the ghost of Sir George Villiers, mentioned by Clarendon, often cited, appearing about midnight to the officer at Windsor Castle, urging him to go to his son, the Duke of Buckingham, and forewarn him of his approaching assassination, is well known.

Quite recently, Dr. Brewster has made known in a work many cases of ghosts perceived by the different senses, and it is said, Dr. Hibbert, in his *Philosophy of Apparitions*, has done much to explain their nature.

REFLECTION I.

On the mental phenomena of Somnambulism.

The subject of this affection recorded at page 404, at the age when her sex exercises the most charming dominion, lived but to be happy—was gay, beautiful as the wild flowers and poplars of the hills of the author's native land, where she drew the first breath; and her mind clear as the living waters of the Saluda, in which she loved to watch the sun go down in a bath of foaming, sparkling gold. She was without any predisposition to mental affections.

The history and circumstances of her case show—she rose from her slumbers; travelled through the darkness of a night, in which the power of all natural vision had been useless; made the dangerous pass of the log over the water; walked amid precipices and dangers; and without her knowledge and consent, went to the party.—Nay, achieved what she never could have allowed.

What is the nature of the perceptive force, by which she was conducted? for we must admit in her a directing power of intelligence operative by sensation, or she could not have taken a definite direction. It was not the path, which guided her footsteps, since there was none through the field, and since there was a choice made of the manner of crossing the

water. She clambered over the fence, made the only passage of the water then practicable. On her solitary journey, accordingly, she was sustained in proper relation with external objects, which alone could be due to the continued exercise of external sensations—the sensations of somnambulism. The sense of touch only could be suspected of having exercised any directing agency in the case. But observation has shown, that such subjects are perfectly unconscious of all external impressions; even a lighted torch held under the nose without burning has failed to wake them. The ordinary senses, therefore, do not direct the somnambulist wanderer, since the mind remains in a state of absolute unconsciousness on their impressions.

Upon this state even often depends the only safety of the sufferer. Had our fair somnambule but woke the least, when her slippery feet were pressing the log, the loss of her life had been inevitable. Of all the mind's acts, its volition and judgment only appear here to occupy their proper place.

From the facts, it is therefore certain, the mind perceives and judges correctly of external objects in somnambulism, but not by the common senses or ordinary provisions of the organism. That the mind by any development or exaltation of innate power, can perceive directly or without organic intervention, is unphilosophical, untenable. Nay, since the body is to be *renovated*, there is no reason to think it will ever reach a state of perfect independence, but that its activity, through infinite duration, will be defined by organs.

We must, then, I think, conclude, there exists in somnambulism, and perhaps some other affections, a peculiar relation between the mind and the five senses, in which, at least, their concentric action is completely suspended, and organs not ordinarily senses permitted to supply their functions.

Analogously in some respects, we see all the tissues of organic life perform their various acts, and never transmit to the common sensory a solitary impression to stimulate the mind's activity. But the moment disease comes, through their altered relations, each becomes a sense, to which the mind responds by perception. This perception ceases at

the moment of recovery, as does the somnambulistic perception on arousing the person.

In sympathetic or magnetic somnambulism, Prof. Lobstein and others are convinced, "the ganglioso-abdominal centre is forced into a new and altered sphere of action which enables it apparently to perform the functions of the cerebrum." Buffon, Lacaze, laid great stress on this centre by making it the seat of the pathetic movements. Bichat has immortalized it, and laid the groundwork of ingenious conjectures for yet ages. The twilight of great philosophers misleads afterwards. A thousand observations establish the brain the immediate condition of the mental phenomena. Why, then, make the abdominal centre a separate seat of the mind? no advantage can be gained, and the order of phenomena does not demand it.

In the case before us, the features were not natural, but permanently fixed as marble, giving to the countenance a strange and peculiar look; the color of indescribable whiteness, and the touch of icy coldness. The features were unmeaning—the soul had deserted them to articulate through other organs. The skin was pale and cold—there were great fullness of the arterial trunks, sanguineous plethora of the brain, of all the abdominal viscera; and the plastic molecular movement or life was exalted in them in proportion to the depression elsewhere. The skin was icy cold to the touch.—The experiments and observations of Brodie, Chossart, Despretz, and Dulong, have put beyond all doubt, that respiration has a share in the production of animal heat; and that this heat greatly and essentially depends upon the act of innervation. There was then too great a deficiency of the nervous energy in the whole surface of the body.

A definite portion of this energy distributed to the organs, constitutes the basis of all the functions with which they are charged. If any one receive more or less than the due proportion, it can no longer respond in the natural order to the general movement of the whole. May then the withdrawal of the nervous energy to an excessive degree from the surface of the body and external senses, isolate them from the

encephalic focus, and, consequently, cut off the mind's intercourse? May this same energy generated now more abundantly from the increased quantity of arterial blood supplied to the nervous pulp, radiated, concentrated in the internal organs, escape in constant explosions by some of the nerves leading to the external surface? And may the new force thus imparted to these nerves, capacitate them to receive and transmit impressions from external objects to the cerebrum, and establish new channels of communication between the mind and these objects?

All the extremities of the nerves which commonly transmit impressions from without, are expanded in the seats of the senses to receive the stimulations of bodies; and, to this circumstance, I have shown, all our knowledge of external nature is due. Do these nerves, which perceive in somnambulism, and regulate locomotion, receive these stimulations alone by virtue of the great centralization, concentration of the nervous energy in them? And may any nerve terminating externally thus actuated, become a sense, and are those of the ordinary senses papillified simply to help out their capacity for receiving material excitements, at the ordinary rates of normal innervation? Or may the external extremity of any nerve not papillified, through the power alone of excessive innervation, receive the pictorial representation of objects, and awake the mind's consciousness?

None of these questions will probably ever admit a positive answer. Yet we may be pretty certain, in all somnambulism, a great change takes place in the distribution of the nervous agent. In this change, all the external senses appear to be paralyzed; or the reciprocal union and activity between them and the cerebrum suspended; and the mind looks out on the surrounding scene, and feels nature through unaccustomed channels, in a way that makes humanity shudder at humanity.

The experiments and observations of philosophers now so often invoked, establish most incontestably the *polarity* of the motion of the nerves, which is inductively the motion of an imponderable substance elaborated by the *cerebrum*. Too

little is known of this substance, as of the imponderable attractions generally, to identify its polarity with magnetism, electricity, galvanism, the force of chemical affinity, or of gravitation. Its manner of motion is the same as these, or in two opposite directions; and, when I speak of it as magnetic, I mean simply as to the manner of action.

All the phenomena of this case now cited, arrayed in discussion, evince a loss of equilibrium of innervation between the internal and external parts of the organism; or, accordingly to the restrictions just given, the central nervous organ has magnetically deviated in relation to the external senses, and periphery of the body, and become nosological in function. In this deviation not profoundable consists somnambulism. Or this deviation is neatly the organic state, which answers to this affection—is the essential change in the state of the organs, which answers to the change in the state of the mind which is somnambulism, the one always implying the other. In this inquiry I pretend not to penetrate the mind itself, immechanical, indivisible. I contemplate somnambulism only as an affair of the organism, beyond which, beyond truth.

The blind walking feel their way; the somnambule advances freely and boldly along. The sense of vision or a sort of preception analogous, appears to constitute the conducting power. If any other sense be active, it must be feebly so, since small objects are suffered to wound the feet and other parts of the body. And those who invoke the stupefaction of this affection by magnetizing for surgical opportunity, assure us, the patient is conscious of no pain in the most capital operations.

In the case reported by Prof. Lobstein, as in all such cases, vision did not appear to extend beyond the surface of the body, for, it will be remembered, the letters were not read until placed on the *scrobiculus cordis*. But in the example we here consider, distant objects must have been visible. Are there then many shades in somnambulism; does the sight become more extended in proportion to the centralization of the nervous agent, or abnormal modification of the

polar action of the moral organ? And in this way, may vision be extended much beyond natural, nay, to limits almost infinite. There are some phenomena of animal psychology, which make the existence of such extraordinary vision suspected, as employed by nature to help out her conservative economy.

However distant, whatever obstacles oppose the view, it is known the honey-bee flies in a rectilinear direction to the hive. To the joy of the traveller in the pathless wilderness, lost and fearing death, his horse unrestrained finds his way unerringly through the gloom of night to some distant place, where he has been fed. The young of the water Testacea hatched out on land, reach the ancestral stream by the nearest practicable route, whence their parent emigrated to give them life. Some mules, a few years since, taken near the Cape of Good Hope on an English home-bound ship, in great distress of weather, were thrown into the sea off the Western Coast of Africa. Several tongues of land projected out toward where the ship then stood, about 20 miles distant. Three of these mules, according to account, swam to the nearest tongue, during this Stygian, disastrous night. The little snow-birds emigrating, fly from the western shores of Scotland through the deep expanse, where no object points the way, to the American shores in 72 hours.* The colossal cranes, which frequent paludal Georgia and Florida in the winter, spend their summers in the marshy grounds at the foot of the Eagle Hills, seen there by Capt. Pike, on his journey by land to the Pacific Ocean. There, in the boreal hemisphere, they pass the season of love and fecundity, and afterwards fly with their young to the sunny, food-bearing plains of these countries, the distance more than one-fourth of the earth's ambit, thus making all the rays of the sun their own. A gentleman in Canton about going abroad, shut up his dog. The animal afterwards escaped, and came up

* Dr. Fleming, *Philosophy of Zoology*, states, "many of these little creatures about to emigrate were caught in Scotland, and the hour and day of the month marked on them." Several were taken about Boston and elsewhere in three days afterwards.

with his master, after the hundreds of thousands who throng those streets, had trod in the same footsteps.

How could the system of Descartes, of Locke—the system that founds all in sensation—make out the psychology of such facts as I have now cited? There must be ideas which have other origin than ordinary sensation; and senses in living beings, not generally admitted by philosophers. And since it is manifest, the mind modifies by age, sickness, health—all organic vicissitudes—that any change in the mind implies a corresponding change in the organism, and *vice versa*, we should seek in organic causes, in those of the encephalon especially—the immediate actuating instrument—the reason and explanation of these curious and interesting phenomena. The power, which conducts in the emigration of birds from one hemisphere to another—conducts in the cases I have cited, assuming them all to be true—cannot be the unerring power which guides the planet in its flight, can appertain to no law, property of materiality. It is the power of intelligence imparted to animate beings equally unerring, and, in emergency or otherwise, placed under their control.

The conducting power of intelligence in all these cases, except the last, which probably does not differ, is that of vision or a mode of sensation similar. The phenomena claim for it, necessarily make it so. Can animals, then, by volition effect a change in the magnetic state of their nervous organs; induce spontaneous somnambulism, or a condition analogous, and look out with peculiar polar sight on things otherwise infinitely invisible by distance, and the depths of space—nay, bring the universe into their presence, and subject it to their inspection? What more angels, who may fly beyond the beams of the stars into provinces of the Omnipotent, not come to us to think of?

With this omniscient sight, about to emigrate, do these little birds of Scotland, of less than ounce weight, through day and the gloom of night, as the mariner on his compass, gaze steadily on the American shores, hid far beneath the earth's convexity, and thus direct their flight? By this

sight of all-foreseeing nature, does the horse in the wilderness hungry, eye returning his distant feeding-place in the valley beyond the mountains—the young Testacea see the water before them they are to approach—the bee wandering and gathering honey, the hive—and did the *stupid* mules buried and forsaken in the starless waves to perish, behold the nearest point of the African land, make it their choice, and shape their course seeing? Could these insects, birds, these mules little more in make than Balaam's ass, but speak, human philosophy would rejoice to listen.

The operative existence of such vision in animals is declared most absolutely by the facts; doubt only can rest in the explanation. The reason must exist in the encephalon in relation to the mind, or in the encephalo-pneumatic connection, or the facts themselves and much of what is regarded as the instincts of animals, are true prodigies or miracles, the causes *divine*, and unsearchable. But the facts are physical, the causes are permanent, and, therefore, physical. The vision, consequently, is dependent upon some peculiar state of the sensitive system—this state, a deviation from that of common vision—the cause of the deviation, polarity, demonstrably operative, at least to some extent, in all ordinary sensation, and the voluntary movements. If the cause be not as I describe, it inevitably depends upon the altered action of molecular nutritive affinity, offering change to the cerebral structure, which, from the instantaneousness of this vision evidenced in the bee going to the hive, the mules plunged in the water, &c., cannot possibly be. This change demands time, but polar variation is instantaneous, which comports with the phenomena.

The conducting property of this *polar vision*, as I may then call it, does not operate by the definitions objects give to space. It resides wholly in the creatures' mind, independently of all external locality, as I have ascertained from actual observation.

Often I have enjoyed the opportunity of observing the emigrating cranes. Their wings tire on the steady flight. At the distance of some leagues, they regularly fly round in

a circle, but always resume their onward way in a straight line with the one they had finished; so that their course through the atmosphere would be represented by a straight line, with circles touching it, at pretty regular intervals.

If they were guided by the position of terrestrial objects they see, they would not resume the onward flight in a straight line with the one they had finished. And, too, the direction of their course in the darkest night, when the earth is obscured from their eyes, is the same as in open day, not less true and perfect. In another hemisphere far distant, they gaze steadily through the earth's convexity on the nuptial land, the land of their love and tender cares to which they go; or on the plains of our Georgia and Florida, white with the solar flame fecundating food. Their hearts full of gladness, they fly high in the vault of heaven. In the still and lonely night, the joy of the loud, shrill song of their march falls on the countries over which they pass, stirs the dead dull ear of sleep, and they dream of seeing angels, and enjoying the divine melody of Heaven.

The sublime effects of this vision cover in the shade the proudest exploits of human genius. Its possessor, through it, wields science, whose course is infinitely above that of man's—offspring of his sickly sensations, slow in action, often wrong, groveling, creeping in the dust. Could he manage this vision, soon he would do more than pile Ossa on Mount Pelion—thrust his head above his being's make without reverence.

More than twenty huge centuries passed between the first of the Phœnicean navigators, and those who began to sail with the compass. During this long and tedious interval, man continued to make observations, and put the specks of thought together, which finally perfected navigation. Error kept pace with truth, which required the consumption of much labor to lop off. The separate ideas had often to be torn asunder, and put together again, before the perfect form was obtained—before man navigating in the dark, in the light, could tell to what shore he was tending.

The force of intelligence in one of the little Scottish birds

I have mentioned, its brain a pennyweight, despising the rust and the smoke of time, in a few short days after incubation, accomplishes more perfectly the same thing. Poised on its little wings, it mounts into the blue of the stars. Its brain, as a mirror, reflects visibly to it, the country of emigration on the other side of the world—is a living mariner's compass, by which it sees its course, and soars unerringly to its destination. And, in the fervid action of volition on its pinions, it commands a power of motion, which outspeeds far all human boasted engines impelled by fire—engines which are maddening the movement of actual civilization.

What shall I say! the rays of the Eternal Reason have fallen on all creatures, of which they make a different use according to the model of their being, from the angel, who is higher to the insect which is only lower.

Although these emigrating birds do not direct their course over sea and land by the observation of celestial or terrestrial objects, they, nevertheless, at the same time, besides the *polar somnambulistic*, enjoy the sense of common vision, and are alive to external excitements as is evidenced by their acts.

A gentleman worthy of confidence relates—"Some years since, he wounded a goose in an emigrating flock, which brought her to the ground. She remained about his yard for a long season; and became very tame, and docible. In process of time, the music of her species again fell on her ear from a flock passing. As the strains grew louder and louder, she ran about the yard a few moments in much agitation, then mounted into the clouds, and flew off in the train. During the emigrating season, some years after, he observed a company of these birds on the approach. A portion split off from the main body, and lit in the yard, which proved to be the tame one with her young, which had left him."

If this be true, they judge of localities, but must direct their flight by polar sight. They are sensible of danger, enjoy all their common conservative senses together with that by which they direct their course.

The polar or somnambulistic sense of animals, therefore, under the power of volition, differs in circumstances from that of our species, which is always the effect of disease, and quiets every other sense, while it continues.

Compensating animals with this sense to help out conservation, nature has enabled them by it, as we have seen, to rival, nay, infinitely surpass, in some respects, the exploits, achievements of reason in us—reason, which needs so much training, colleging, to be placed to good account. It is to this sense supplying in them the place of the profoundest science, we may conceive, are due their admirable works of art, which, as I have already said, have stimulated geometry, and offered to human reason the most profound suggestions of invention:—works, which have been equally perfect in all annals; and which have characterized the active life of each species through the flights of all their ages, with the same fidelity, with which the laws of their separate organogeny, have preserved their generations' models.—Everlasting demonstration, and memorial of the action of Divine Providence on the world!—Sense which has been seized upon by man in the east, and subjected to his service in the pigeons, which, according to Staunton,* and others, convey the mandates of haughty monarchs throughout extensive empires in the space of a few short hours—sense, when the world was a shoreless water, that descried on the abyss the “olive branch,” which called forth hymns of joy, and grateful hosannas.

But after all nature's pains, brutes, if I dare call that brute whose acts I have been describing, constantly perish, where a particle of our reason would make them live, and we sometimes perish with our reason, where a particle of their sense would secure life. A ship, some years since, stranded on one of the West India shores in a hurricane, and lost her whole crew in a few feet of safety. A few rays of light had saved them. These pains leave room everywhere for death.

The polar sense of perception presents external objects as

* Embassy to China.

they really are, or it could not so successively conduct man, the subject of it, over precipices, and amid dangers unhurt; emigrating fishes through the floods to distant shores, birds, &c. It differs, therefore, precisely from the sense of *disæsthesia*, or of the hallucinations of the deranged, the maniacal.

But this polar perception in man must admit of modifications, for, in somnambulism, or sort of phenomena constituting it, as I have noticed already, there appear to be many shades. Besides the one in which the body participates in the movement, there is another which manifests itself to be purely mental. In this species, the ideas already in the mind from ordinary sensation or imagination, are presented clothed with external forms and existence, giving rise, as I may say, to a strange wandering or *walking of thought*. The "snow-white camels," seen by Mahomet, "with pinions of flaming gold, on which the pious sainted spirits of Islamism are borne above, to be introduced into the joyful presence of the long, black-haired girls of Paradise:"—"the flaming," "pale," "red-rosy sun of Heaven," the flowers growing in the gardens, and about the habitations of the angels, presenting, in the natural arrangement of their colors, living rainbows, and other figures evidenced to the senses of Swedenborg, are phenomena of this sort.

Mahomet and Swedenborg, therefore, were the subjects of this ideal species of somnambulism. Persons thus affected meet their own ideas out abroad, never recognize, but look upon them as they do upon the substantial forms of nature, and feel the same consciousness of their independent, external reality.

In his fanciful conception of Don Quixote, Cervantes has worked up this ideal somnambulism, or transubstantiation of ideas, into a form, which must excite the merriment—the loud, convulsive laughter of yet distant posterity. The monks of Mount Athos, mentioned in the ecclesiastic history of the fourth century, are other notable examples of it. There is a peculiar sort of meditationists in India, noticed in the voyages of Bernier, in a letter to Chapelain on "the Superstition of the Gentiles," who procure this

affection by persevering starvation. They pass their time in the dark shady retreats of their gardens remote from cities and society, and enjoy the person of the Divinity in an exceedingly bright, white, inexplicable flame of fire. I will make here one general remark.—May it not be hereafter discovered, that many of the forms of insanity, are directly dependent upon the polar habitudes of the brain, as well as upon its nutritive deviations or structural degeneration?

Constant and intense meditation long protracted, isolates completely the mind's consciousness from all external impressions. The state of the encephalon induced by this action of the mind, gives origin to another form of this affection, which is also ideal. The *Improvisatorists*, the *Illuminated*, the *Contemplationists* of Persia, Italy, are specimens. The great thinkers of all nations have furnished some examples. Cardan, Varignon, Newton, Thomas, Mendelsohn, Boerhaave, were subject to it. In his "Experience in Physic," Zimmerman has recorded the names of others. St. Augustine mentions an ecclesiastic who could bring on the affection at pleasure, and, for his opinions, suffered the most cruel tortures without the least sign of pain. Did the South American Indians, under the exterminating sword of Cortes and Pizarro, possess the art of procuring this affection, which enabled them to suffer all the torments and deaths Spanish ingenuity could devise, without betraying the least weakness or sense of pain?

The perceptions of the various species of ideal somnambulism now cited, differ precisely from those of fancy. The images of Homer, Ossian, Dante, Shakspeare, Milton, are formed upon the code of physical laws. They admit nothing *existant*, but what comports with this code. Their creations are the affair of reason, not of their own sense and consciousness, which constitutes neatly the difference. I will close this long, I fear, tedious reflection, with an observation on the directing sense of the somnambulism, in which the body participates—every way marvellous and unprofoundable.

The condition of all distinct, natural vision is, that the rays of light coming from any object, must subtend a definite angle in the eye. There can be no subtension or angles in the nervous extremities we suppose to act as visual organs. The appearance of the same object is greater or less, in proportion to the acuteness or obtuseness, size of the angle, the visual rays will subtend, which is regulated by the distance. Thus the sun, though so much more voluminous than the moon, from his greater distance, subtends about the same angle, and appears of the same size. Accordingly all objects, however different their magnitudes, will appear of the same dimensions, if seen under the same angle. And if they be removed beyond the point at which angular subtension can take place, they become invisible.

The laws, therefore, of light or of natural vision, every way define, and limit its operations, while the vision of this somnambulism operates in the blackness of night, as in the brightness of meridian light, and shows itself to be perfectly independent of all these laws. Persons reading sealed letters; roving in the dark amid perils unhurt; the passage of birds and fishes in a straight line to distant shores and places, attest this independence. Is it to this freedom from the restraints of natural vision, are due the perfectness and boundlessness of the view of the human and animal somnambule?

But to suppose the organic sense of any creature can stimulate or actuate itself, is unphilosophic. The cause of this, as of natural vision, then, is external stimulation. Besides light, what exists universally in nature, that can stimulate, but the force which co-ordinates our stars with those of all others, into one movement?—force, which radiates the abyss of space from all bodies, and stands everywhere in polar equipoise—force, which so *stimulating*, must show the universe, it pervades, encircles, and holds to its place.

REFLECTION II.

On Ghosts or Apparitions—Phantasmogeny.

Some of these phenomena, at least, I think, must be regarded as the effects of the ideal somnambulism just described.

If we suppose any ideas exercising a lively influence on the mind, can provoke it to react on the intracranial focus, as it does in all ordinary sensation, the senses must become affected in the same manner they would be, if the objects were really present, to which the ideas correspond. I have shown already, that the senses are always affected by the mind's perceptive act; or that the mind's eccentric reaction returns to the sense or senses impressed, which is implied by, "I see with my eyes," &c., and that, if the reaction does not return, there is no consciousness or perception.

If, then, ideas lively affecting the mind, can cause the transmission of its movement through the intracranial focus to the senses, as in all ordinary sensation, the objects, which these ideas represent, must appear to the mind as really external, as if they were actually present and impressing the senses. That ideas of themselves occasionally can thus bring about the condition of the organism, upon which their primary perception depended, I suppose possible, and from facts, probable.

Accordingly there are ghosts or illusions for all the senses. Those of sight the most freezing, have made the greatest figure in the world. Dr. Brewster mentions the case of a lady, who, at several times, heard illusorily her husband calling, and rapping at the door. Another was much annoyed by a phantom cat, which would appear close to her. In the Diary of a Physician, we all remember the story of the spectral dog. The "frozen hands" of airy phantoms have been felt. The senses of taste and smell must have their apparitions, but the sort of objects they perceive, can never awake much terror to give them celebrity.

The physiological difference between the apprehension of

real and spectral objects, may thus be neatly precised. 1. The real object stimulates the sense by which it is perceptible. The corresponding nerve conducts the stimulation to the common sensory. If the mind now be affected by the stimulation offered, there will ensue consciousness of the object through the mind's eccentric reaction on the perceiving sense. In this case the stimulation begins in one of the senses, and recognizes for cause something external.

2. The idea of an object thus perceived becomes associated with a series of others, in some one of which, the mind feels a deep and lively interest. The mind, through the vividness of its conception of this former sensation, now an idea, or one of its compeers, excites the intracranial focus, the same as when it first perceived it; the excitement of this focus is reflected to the external sense in relation; all the physiological conditions of external perception are thus fulfilled; and the phantom object appears in outward reality. In this case the stimulation begins in the mind—some idea, the cause.

In illustration—the health of Mr. A——declined. Shortly before his death, his apparition in the winding sheet, appeared to his lady, musing and promenading in the favorite family retreat. She predicted his death to her friends with convulsive sorrow.

Julius Cæsar, with his army, after the long wars, in which he had been engaged for the interest and glory of his country, pitched his camp on the banks of the Rubicon. The Senate had purposely decreed—"who passed this stream with an army, should be considered as an enemy to Rome." Profoundly meditating upon this decree and the future Fates, Cæsar passed the night roving up and down the margin of these forbidden waters. Anxious and perturbed, he was waiting for the gods to speak. Just before the dawn, meteoric spectres flashed down upon his vision, from the cloudless vault of night.

The cause, however, of such phenomena, is not always an annoying idea. There appear to be reciprocal states of the cerebrum and the mind, which are favorable or predis-

posed. Irritation, temperament, cast of sensibility, temporary polar excitements of the brain, may have their influence; the spectre appears to present itself spontaneously, as in the case cited of Mr. D., but I apprehend, always by the same mechanism—*eccentric movement of normal sensation*.

Indeed, I know not the reason, why the conception of all ideas that relate to external objects, does not always and invariably present these objects spectrally;—in other words, why the conception of such ideas, like the perception of them, does not invariably break the equilibrium of the cerebral focus, and thereby modify the sense or senses in relation. Like the valves of the heart, which prevent the regurgitation of the blood, we may suppose some of the structures of the brain, whose uses are unknown, prevent the eccentric reaction of sensation, and thereby the mind is enabled to meditate upon its ideas without being disturbed spectrally, or by the presence of the objects they represent.

If this eccentric reaction was not barred, and a human being could be translated to a spiritual state, in the mind's meditations, it would still behold all the forms of nature the same, and feel the reality by the senses. The reality would be wholly in the mind; all external, an empty show, the visible, perceptible world, a shadow. Those philosophers who regard such a state of things as this, as the true or actual state of nature, ought to look upon apparitions as having, and the only objects which have a real, external, veritable existence. Since the mind's perceptions with them only enjoy a real existence, are effects without mechanical causes, such a state of humanity and the world, as they represent, do not comport with the manifest plans of Divine Providence, whose works evidence an eternal progressive motion of cause and effect.

The senses always affected in perception, are quiet in conception; or in the return of ideas to the mind, except in the rare instances of apparitions. I think we must admit, as intimated, a structural contrivance in the cerebrum, whose special function bars up the access to the senses; and bestows on the mind the privilege of reflecting upon its ideas,

in the absence of the external objects the prototypes, or without having them so engaged, to intrude upon its presence in bodily shape. Spectral apprehensions, therefore, dependent upon the abnormal function of this structure or organ in the cerebrum which regulates the mind's action in relation to the senses, are morbid phenomena. Superstition in the world, they are shades in the mind out of the natural order, which strike it with terror.

SECTION VI.

CONCLUSION

Upon this chapter on the sensations.

THE apparition, the somnambule, the raving maniac, differ not more from common humanity than minds appear as seen by minds. In the immensity of the disproportions observable in them, their variations in quantity, force, quality are so great, as to have but little in common to mark the identity; so that "*common sense*" is a mere approximation of differences. The usages, manners, institutions, religions, superstitions of nations, are enigmas to one another; objects of mutual disgust, hatred, ridicule, and burlesque, as are the peculiar opinions, dogmas of individuals in society. What was the height of glory and ambition of one age, another looks upon as low, worthless, trifling, contemptible. Man shows to man in the light of folly and madness, whether presented in the revolutions of time, or in his own generation. His politeness is mainly the sacrifice of feeling and opinion for peace, and the conciliation of good will—a prodigious, energetic force in the mechanics of human nature. Some few, however, born alike, see with the same eyes, and form an exception.

This difference is still more striking in man, looking at man across the gulf formed by letters. The sublime propositions uttered in the porch of Zeno, the Lycea, and gardens of the philosophers and academics, were strange and wonderful to the vulgar Greeks, as the ravings of madness. They

trembled when they heard that Lucian* had exposed to laughter and merriment the amours and follies of the popular gods, whom they held in the greatest awe and veneration. The illiterate Romans feared the vengeance of the thunderbolts for Tully, who conversed familiarly about the acts and life of Jupiter,† and derived his name from *juvandum*, *helping*. They took up Numa out of the grave to recover some writings supposed to be unfavorable to the actual worship.

You tell the honest simple, that Newton and La Place knew the size and weight of the stars—the earth revolves—that the precise weight of the atmosphere has been ascertained by the *vacuum* of Toricelli—he does not see it so. To him you are wild, deluded. When the British philosopher related to the Islander under the equator, that in some seasons, water would become hard and solid in London, he boldly pronounced him a liar. When Roger Bacon set his clepsydra in motion, they pronounced him worthy of death, saying, “he had been taught by Satan.”

The senses of man operate only on a given area of the universe. They operate as we have seen imperfectly; their actions are the resources of his intelligence. His mind launched out in the open space of nature, shows nothing. On the one side extends eternal duration; the events, history, philosophy unknown; on the other, the same duration, extends an unwritten page. What is his world? a scale in which good and evil press with equal weight, but in which the universal Divine Benevolence has manifestly operated conservatively to secure the good to all living creatures. What are the legends of his race? a tissue of treasons, assassinations, wrongs, sufferings, outrages, murders, abominations, cruelties, pillages, pieties and impieties toward heaven, rebellions, revolutions. What is his world to him? nothing but what his senses as his resources make it. What does he see? orbs of fire dashing above his head, whose raging flames scorch the soil on which he treads, which appear and disappear—hot worlds, which threaten, but do not dry up, consume the corrupt torrent of his guilty genera-

* In his Dialogues of the Dead.

† In his Nature of the Gods.

tions. What beside? that he is borne along in the motion of these worlds, which are rapidly carrying him from nothing to nothing. What does he feel? to himself a stranger among strangers. Darkness is both before and behind him. "I live," cries the true philosopher, "amid the greatest obscurity; but amid this obscurity I behold the Divine Benevolence. Its beauty, loveliness charm me. It attracts me away from myself. I love, I will follow after it. I will be merciful to all that are animated by the divine breath of life—breath, which is the signet of the Divinity. Under its power I feel compassion for my race. I will return good for evil; right for wrong; joy for affliction; love for hatred; humility for arrogance. I will feel but pity, commiseration for the wrongs, sufferings I endure. I will imitate the ways, perfections of the Sovereign of Good; press them on my heart; copy them in my life. I will follow after His benevolence. It will lead me from this obscurity to the light, which will show me the end of my existence—lead me to Him, which alone I desire."

"Ah!" he cries—"I live but amid desolations—the ruins of what has been. I breathe the same air all generations have breathed. Their sepulchres are my habitations. My pathway lies over their broken, shapeless bones. The soil on which food and flowers spring is their destroyed flesh. I but eat their flesh remodeled scarcely cold from the former life. Death, hateful death, is the giver of my food, the minister of my life. O! mutations, eternal revolutions of nature! which continually present the generations of organic man in the spoliations, in the life. These mutations have a voice; they call me to them in the hot blood. These revolutions are coming after; they will hide me in their great shadow. I fly. The hollow tomb re-echoes under my feet; the dead call to me as I pass and tell me my doom. O! scared life, that the archer death hunts down aguing in thy hot fire.

"I tread a lonely pathway through the gloom of my existence. I weep at the altar of *miser cordia* I have raised. Here animals ferociously devour their fellows; my race a

thousand times has bathed the earth with angry blood, making of it the sepulchre of sepulchres. The red flames of war and persecution never cool. I hear the voice of sorrow, the wailings of grief. The good wither in obscurity. The pious waste in dungeons. The orphan's cry does not engender food. Wickedness and madness sit on the seats of power, and rain on the people mischiefs and wrongs. The tears that are continually falling, keep the earth wet.

"I know not myself, nor am I known. Where leads my path through this infinity of worlds; through this solitude of my being? The overflowings of my eyes shall smoothen its asperities. My sighs shall talk to me of the way. My joy shall be the imitation of the Divine Benevolence. I love, I desire to be beloved. Nothing but the love of the Infinite can console me, whom only I can love. My heart radiates its fire towards Him. It will twilight me on the way. But tell, ye fair, ye beautiful of morning, who walk in the blue above, tell me, whence came those snowy robes you wear, and that varicolored light I see, which announce your approach, and, when you are gone, leave on the world the grateful pledge of your return. From whom you first came to roam in heaven, where is He? Like me, do you tend to Him, round whom your blue curves bend? You give motion to the water of time, which bears me on. Conduct me thither. For it is there the radiant fire within me, the same with which you glow in the profusion, would direct. I desire to replunge thy fountain. Lead me thither from this solitude, where I cannot know or be known: where I love but cannot be beloved; where I sit down by the noisy stream of sorrow, and weep in darkness; and all I see but mocks my apprehension. Lead me; you know the way; for some of you were present at Bethlehem. Low then your trailing garments swept the dewy grass; and the wise men of the East followed after. You have conducted me to Bethlehem; the light breaks on Calvary. Its rays fall on my path; my senses are remodeled, and I see."

SECTION VII.

REASON.

FROM *reor*, I judge, think. The Greeks, who paid great homage to reason, and who, in early times, had the honor of giving to its empire the most ample extension, called it λογος, λογισμος—λογομαι—I speak—the same, which St. Paul says in the New Testament, “was made flesh, and dwelt among men.”

Reason, as all the remaining faculties, is an operation on the products of the senses, whose acts are the fundamental elements of the understanding. Where are its traces—records?

The volcanic fire has consumed ; the earthquake intomb-ed ; the sea devoured, fire in the hands of war ; war with her red fingers, has overturned ; the crumbling tooth of all-powerful time has wasted ; death and oblivion have blotted—all the busy powers of destruction have been active—but still they exist in ample undiminishable plenitude. They are scattered over the Oases, the Thebais, the great Delta of Egypt ; the broad plateau of Asia and Europe. They are legible in the mausolea, columns, Sphynxes, Teraphim—in the ruins of Osymandias, Thebes, Heliopolis—in the thousand cities over whose magnificent remains the dust is falling, accumulating, and the blight of the desert sweeping—in the history of written thought—in the stones shapen for eternity into the likenesses of birds, beasts, men, gods, goddesses, intended to perpetuate the remembrances of governments, people, manners, great actions, religions. To those who will be posterity to us, they will be more legible still in the sciences, arts, operations, inventions, enterprizes, industry of living men.

Traditions.—Where ranges thy course, O reason ! What limits thy mighty movement ! The Fathers of men tore from thee the crazy trappings of time and space, erected thee into a Divinity, and paid holy homage. Shall their devotion to thee be now blamed ! shame heaped upon the

gray hairs, whence we have come! Thou wast the first light that shone on the infant world; then the only light. The voice of tradition is, thou didst reveal thyself to the great Father of the sons of Bore; and made thy habitation on the shores fettered by the frost of the Scandinavian seas. That in the most ancient times, thou didst descend into flower-bearing India, and suffered thyself to be incarnated in the person of Brahma. The old Chaldeans, Phœnicians, Sabians, Moabites, Persians, saw thy image in the flaming exterior of Bel, Osiris, and Oromasdes. The worshippers of Kneph regarded thee as having come down from Heaven with Hermes, who brought with him the alphabetical characters, and engraved them on marble.

The first poets saw thy shining feet walking on the Em-pyrean. They beheld thy radiant form in the eternal Fire, which created every thing out of himself. The early philosophers abandoned themselves to thy precepts; honored thee with the noble titles, “the tongue of Heaven vocal in the ears of man;” “repository on earth of the golden beams of light and truth;” “medium between the finite and Infinite.” They heard thy voice calling them as “the voice of God,” and yielded themselves implicitly to thy sacred inspirations.

But where ranges thy course? We see it everywhere. It penetrates the exterior, the interior; the high, the low; the shallow, the deep—the compages of things—and the corroding flight of the seasons cannot efface it. Thy evidences are written on our hearts; they are manifest in the operations of the external, the internal senses, by which we eat the grain and refuse the husk; the honey but not the comb—by which we maintain our just proportions with the universe. They are engraven on every fibre of animated existence; on every form of matter—the face of every star.

Thy course is everywhere; thy pathway winds through all beings; we can trace it everywhere. It extends where we have not been—*trans mœnia flamantia mundi*; and vanishes into that infinite Abyss, whence all things first come, to which all tend.

The Greeks joyfully received among them the Hermes of Egypt. They believed thou didst descend from Heaven with him ; and gladly welcomed thee to their shores. It was in the days of their simplicity, and purity, thy approach was announced. Then it was a law held sacred among them,—“who spoke, should speak the truth.” Hence they called thee λογος, which is thy proper, but since, abused name.

The world is full of light. Its beams fall back on the eternal night, which hung once with incubus weight on the hearts of men. The efforts to disperse it throughout the comfortless earth, where the human savage still roams forlorn, will be the glory of the actual epoch. An immortality of pleasure, good is unveiled ; all uncertainty, forever vanished. The λογος, has really descended ; not the fabled one of the incarnated Brahma, or the companion of the Egyptian Hermes ; but the true, the sovereign λογος, of the New Testament—the Eternal Reason, logic, wisdom, nature, end of things. But it is reason, as a faculty of the mind, which only has claims here to our efforts.

Reason may be defined simply—a mode of mental activity. It operates with very varied intensity, excellence. This is manifest in the infinitely diversified force with which the same or different kinds of truth, are presented to different minds. Without culture it is nothing ; and truth is always felt by it with the greatest impetus, when it comes in the direction of this culture.

The history of great men shows this variety in reason ; and that there is an original aptitude in minds for the discrimination, perception only of certain kinds of truth. When Newton* read Locke's Treatise on the Understanding, which had been kindly sent to him, he saw in it but little other than insanity. It inspired him with melancholy ; and he said in his dejection of spirits—“my old friend Locke has certainly gone mad.” But when M. Destutt-Tracy read the same work, it filled him with the most lively pleasure and enthusiasm. His own mind showed to him in new and more ample dimensions. The same pleasure was felt by Malebranche,

* Vid. Dr. Herschell's Hist. and Life of Newton.

on looking over Descartes, which fixed forever after the direction of his studies. The minds of Locke, Destutt-Tracy, Descartes, and Malebranche, were mirrors, that reflected alike the works of nature. They could recognize, trace in one another, the same images of thought, hid to the eyes of other men of different mould—images of immortality.

The energetic geometrical sense of Newton did not allow him to see the truths demonstrated in the work of Locke—the first true and genuine system of logic, in the opinion of Destutt-Tracy, human genius ever offered to the world. Nor were the sublime truths and demonstrations of the *Principia* less perplexing and puzzling to Mr. Locke. Thus these two great geniuses, climbing in the same age, in the loftiest regions of human contemplation, were as completely invisible, intangible to each other, as if born on different spheres.

So energetic, specific, I may say, is the force of reason in some minds for the apprehension of particular truths, so annihilated is it in others for the same truths, that in the scale of its variations, like common sense, common reason consists simply in the nearest differences. The ground, therefore, on which criticism can erect a just and righteous tribunal is not very extensive. Though the shades of sanity and insanity run into each other, there is a line which separates. Reason is the hinge on which the mind turns between the two. Its operations not seen, often make man look insane to man where reason is; as was evidenced in the military manœuvres of Buonaparte. Philosophers have generally refused this sublime faculty to brutes. We have already weighed it in them. It enjoys the greatest plenitude in man—fecund source of his sciences, arts, civilization. Armed with it, he looks out on the present; antiquity and futurity yield him their hid treasures, and beyond the senses, he mounts into an infinite orb of existence.

But what is this powerful operative reason? Let us hear M. Destutt-Tracy. "*Nos idées composées sont d'abord toutes nos idées des êtres de leurs qualités, de leurs modes, et des différentes classes et espèces des uns des autres; nous formons toutes*

ces idées en réunissant, séparant, et combinant les idées simples que ces differens êtres nous causent." It is the remembrance of our simple and complex ideas ; their comparison ; the perception of their agreements or disagreements—the just appreciation of their relative values in separating, re-combining them into terms more or less general, that constitutes the operations of this faculty, and makes logic both the art and science of reason. Or, rather, it is the mind itself manifested in these various acts.

Nothing has presented more difficulty to the mind than the discovery of a good method of directing its own forces in the acquisition of knowledge, which it never achieved till Bacon. At eighteen years, he had already detected very radical defects in all the plans which had preceded him. To remedy the evils growing out of these defects, and gain all that was possible from reason, he originated and published the *Organon*. Every one now knows the structure and operation. When this great intellectual engine was put in motion in the world, all the sciences started suddenly forward, as if they had caught the breath of a new life, and since have been steadily advancing.

ARTICLE I.

Influence of local causes on reason.

Nothing is more locally modifiable, as is evidenced in the different proportions of it exhibited by geographical man. In the regions where the sun burns, the propensities vanquish it ; in glacial countries, the cold benumbs it. So that Fontenelle had authority in facts, for making the temperate zones the seat of empire, where it reigns with the greatest supremacy. If reason is an ever-varying quantity in man inhabiting the earth, it varies not less throughout the zoological calendar.

ARTICLE II.

Manner of its productiveness.

We have seen, it is very complicated in its formation—constituted by most all the capital acts of the understanding.

Hence it is easily confused; nothing is more seducible. It is to this circumstance has been greatly due its slow progress, and the vibratory movement it exhibits, as seen in the light of time. It is the great engine of all natural truth. It is slow in its operations, the developments it makes; so that the fruit it is bearing in one epoch, is often gathered by very distant posterity. And often, too, in the revolutions of governments, the changes of public affairs and opinions, its ripening fruit is blighted before it reaches maturity. History bears the most ample testimony to these two positions. Let us adduce some of it.

The knowledge of the true system of the world slept from Pythagoras to Copernicus. Homer, in his great epic song of Troy, flung early over war the mantle of the Muses, dyed with the most rich and gorgeous colors of fancy. His countrymen nourished in their hearts valor, and the loftiest ambition. His efforts helped to fire the natural love of the glory of arms. Greece rose rapidly, and stretched out her empire. She nourished in her bosom philosophers, who warred with nature for truth, while her soldiers warred with nations for victory.

Mean time, Pythagoras returned from the East, published the outlines of the true system of the sun and his planets. Numerous philosophers, compatriots, were pushing on after him in the route of discovery and demonstration. Fresh observations constantly confirmed truth, which had been obtained, and laid the foundation for new discovery.

Much was doing, and had been done, when the Roman arms were turned against Greece; and her foreign allies began to rebel. In the change of the government, which fell into the hands of the Romans—of public opinions and occupations—the work was suspended in its career, when reason had brought her long and precious labour near to completion. Again, when the love of knowledge and the taste of letters began to revive in Europe, and relume mankind, after the long night of oblivion, which had passed over the world, Copernicus with others pursued on in the path Pythagoras had first opened. A few noble minds succeeded,

which threw out the platform, on which Newton finally reared up the demonstration, and fitted in all the materials of truth and evidence.

Had fortune continued but a little longer faithful to Greece, it can but be evident, reason had consummated her work there. With all the preparation on hand, the materials to be wrought all fresh and full of strength, it had been much easier than in England:—And some Grecian philosopher now had worn on his head the crown, which Newton wears, thrust twenty centuries lower in time.

Among the many, I will record one other example. The writings of Sidney, (disgusted at the usurpations of Cromwell,) of Locke, and others, on government, civil liberty, and the rights we inherit from nature to be free, fecundated reason. A public interest was felt, which secured to these topics ample discussion and research. Soon came forth from different pens a number of monographs on international law, civil polity, private and public rights—the philosophy of government.

In proportion as reason, by her slow operations, revealed truth, and conquered error, the public mind became enlightened on the principles of liberty. And these truly great men hoped, one day, their country would enjoy the freedom they saw.

Our fathers brought with them across the water the light in their bosoms; and the moment the occasion offered, it bursted out in the flames of the revolution. Our Magna Charta—liberty—is the offspring of this reason, which has found room with us; but which, the chances of the world as yet have not allowed to operate in form, in the countries that gave it the first impulse.

Thus reason fecundated in one country, yields its slow ripening fruit to the enjoyment of another; in one epoch, to another far remote in futurity. Concluding these illustrations, may I say, but for Providence, posterity ought ever to regret, that civil Greece, the voice of whose philosophy, whose Muses, must eternally inspire mankind, could not

have remained longer, and not fallen in the midst of the light she had kindled on the world.

ARTICLE III.

Influence of physical causes bearing on the future.

Since man is born with the fear and dread of the future always before his eyes, unusual occurrences—prodigies—the slightest jar in the movements of nature—weaken or totally subvert this faculty.

1. The meteoric illumination, or “the falling of the stars,” which occurred in the autumn of 1833, spread cold fear with its stupefaction, and awakened the most terrific apprehensions among the populace. The learned considered it, “the explosion of some ignifiable vapors or display of natural pyrotechnic art;” those who saw only with their eyes, took it to be “the real tumbling down of the elements.”*

The security exhibited by the learned was not without affectation. All looked with suspicion upon the yellowish, pale, rosy nebulosity which obscured the face of heaven. All feared these new visitors in this storm of flames, widespread combustion—these globes of fire as hurled by Omnipotence in fiercest ignition to the earth.

After the succeeding night, when it had been discovered, the stars were all fast in their orbits, the stories told of the transports of this fear, far outstrip in the ridiculous, the real laughable, all those of Rabelais, Cervantes, or Quiavedo. *Stulta corda mortalia.*

2. The stroke of several earthquakes, in the year 1807, was very lively felt throughout the Southern States. The gloomy and portending in religion, beheld in these earthquakes, which would have scarcely attracted notice in Sicily or Calabria, the fulfilment of Scripture. Many singular phenomena

* With greater or less intensity, this meteorization appears to have extended throughout the U. States, and was observed by the navigators on the Atlantic. It continued in Georgia during the 12 hours of night, the whole heaven a boiling torrent of flaming stars, rushing confused in every direction to the earth.

accompanied them—strange sounds in the air—voices articulating mysterious words—mothers untimely shedding the fruit of love—visitations of preternatural figures in sleep—altered appearance of the human visage—sudden vibration of the stars when looked at.

The pious Quakers, who had chosen the middle region of S. Carolina a home for their descendants in mass suddenly vacated their beautiful farms for Ohio, the land of better promise. The 10th of August had been predicted and fixed upon as the day of doom. The unlettered pulpits of the country were vocal on the scenes of this day, as on the certainty ; and, it was not until after it had passed, it was not held to be the last of the world.

3. Connected closely in time with the assassination of Julius Cæsar, a caliginosity gathered on the face of the sun ; and there occurred a great diminution of his light. The Romans, in their furious jealousy and suspicions, had destroyed Cæsar. Fortune had followed him ; he had enjoyed the smiles of Bellona ; Jupiter Capitolinus had succored him in the long career of conquest and glory he had run. Covered by the Ægis of Minerva, he had “conquered three hundred nations,” “taken eight hundred cities ;” and humbled the haughtiest foes Rome ever had. The Supreme Powers were offended. Unnatural darkness had spread abroad. What light remained was strange, unusual ; and the aspects of things no longer the same.

In vain they thronged the temple of victory to offer their sacrifices ; the Stygian shades had gathered ; and eternal night was fast hastening on the world. They fastened their eyes on the great caldron of light, whose torrent they had expected would pour forever. The last rays appeared to be boiling out ; and they could behold the deep, black, scorified bottom, where had burnt the flames of so many days.

Plorantes anxia mente plurima volunt.—Things had lost the tenor of their way.—Wolves howled in the cities at night.—The sacred altars were covered with perspiration.—The ivory, which adorned the temples, seemed to mourn and weep.—Figures of strange and wonderful form were

walking abroad.—Eridanus, “king of wandering floods,” had mistaken his way; and was running lawless through the woods.—Trembling, the Alps shook their high tops.

Fearing, in the absence of reason, what cannot mortals see? Philosophers say, “one sense serves to correct another.” But it is reason, which corrects the errors of them all. Reason uprighted, commands the Alps to be still; remands the gigantic shades of death to the prison of Rhadamanthus. This paleness, decay of the sun’s light,* and the murder of Cæsar, called forth from Virgil these beautiful lines:—

* Servius supposed this darkness to be occasioned by an eclipse; but Scaliger affirms there was no eclipse on this or the following year. Pliny regarded this solar obscuration as a prodigy connected with Cæsar’s fate. Plutarch says “there was a peculiar dulness about the sun—*Circa solem quoque hebetatio splendoris*—he continued the whole year without emitting much light or heat—*Toto illo anno pallens ejus globus, et sine fulgore oriens, debilem et tenuem emisit calorem*.—The atmosphere continued loaded with heavy clouds, and moisture; and the fruits of the earth did not ripen.

We may suppose the appearance of the sun, which struck the Romans with so much apprehension and terror, was similar in character to that which happened a few years since among us. When several dark, slaty-looking blotches of considerable size, with others tinged with pale, red or orange, were very visible to the naked eye on his disk. And the light emitted, as seen on white walls, was pale, purplish or slightly blue, resembling somewhat that seen in sulphurous and antimonial combustion; the entire amount of illumination being very sensibly enfeebled and diminished.

This darkness, peculiar appearance of our sun, corresponds in quality very exactly with that which happened in the age of Justinian as described by Zonaras. In intensity and duration, the Justinian darkness, according to Zonaras, agrees precisely with that which occurred on the assassination of Cæsar, as above in the account of Plutarch. Adhelmus speaks of a remarkable decay of light in the age of Charlemagne.

We may, perhaps, regard all such failure of light, as caused by spots more or less numerous, occurring at the same time, on the face of the sun. Scheiner discovered them, the first, at Ingolstadt with the telescope. Soon after, they were seen by Galileo at Florence. They are not always visible to the naked eye.

Since the beginning of the 19th century, they appear to have become of much more frequent occurrence. According to W. Herschel, they are caused by vapors rushing up from the deep fissures of the sun’s fractured surface, which drive before them immense rolling clouds of condensed light

—Solem quis discere falsum
 Audeat? ille etiam cæcos instare tumultus
 Sæpe monet: fraudemque; et operta tumescere bella.
 Ille etiam extincto miseratus Cæsare Romam
 Cum caput obscura nitidum ferrugine textit,
 Impiaque æternam timuerunt sæcula noctem.

Georgica 1—463.

ARTICLE IV.

Modifying influence of moral causes.

It is never the interest of all men to cultivate reason. Some rulers, as Fenelon so justly remarks, find error useful in maintaining their authority over their subjects. These errors are very various. Numa, all the ecclesiastics who held the civil power, fostered the error of superstition. Monarchs, despotic rulers, hold on to the throne by alimenting, encouraging popular ignorance. Thus the profanation, starvation of reason, become the convenient resources of power, wealth, ambition, royalty. The empiric of all professions lives by his forgeries, flatteries, hypocrisies and blasphemies against reason.

Reason is the companion only of pure virtue; and, forlorn! answers completely the views of the fewest number of mankind. Hence have stood in the world, from all antiquity, with the strength of monumental marble, absurdity and falsehood, the energetic, achieving engines of human wishes, ambitions.

Fanaticism in religion, politics—all the passions carried too far, tend to enfeeble, extinguish the beatiful light of this flambeau, kindled up in us to combat the natural darkness in which we are born. Occasionally these passions rage epidemically, and sometimes consume whole ages. The hot furnace, in which they boil becoming cooled, often it happens, one generation looks back on another with distrust and astonishment, and the course of reason appears lost on the

through the solar atmosphere. This light constitutes the shining exterior of the sun. These vapors darting up, dash on, rolling up in clouds the radiant matter, and appear dark spots—or, in places, expose the black scoriacious surface of the solar body.

route of time. Indeed, what feeling of our nature is it that has not had its paroxysmal burnings?

Among these moral epidemics, I may mention that of baptism, which raged so high some ages since, that every midwife was commissioned, in the event the foetus was about perishing in parturition, to administer this sacred ordinance, *impulsione aquæ sacræ*. Every one knows the ridicule and irresistible laughter, into which Sterne* has converted this pious folly. The *polemic divinity* of the fifteenth and sixteenth centuries; the *holy wars*, which caused so great and useless a devastation of our species; *knight-errantry*; *transfusion* of blood for perpetual rejuvenation; discovery of the *alkahest*, *philosopher's stone*, the *universal menstruum*; *quadrature of the circle*; scar, mark deep on our modern ages, the epidemic fury of the passions.

But sometimes the cultivation of a particular science or sciences comes in fashion: then the passions, redeeming for the mischief they had done, in their milder form come in aid of reason. Thus geometry after Newton, chemistry after Lavoisier, made a quick and rapid advance toward perfection. Philosophical anatomy, operative medicine, internal improvement, are doing the same in the actual time.

Through this paroxysmal force of our nature, one day, the love of the fine arts, as the fire, which warms my meridional country, will burn; and the beautiful statuary marble of Cherokee, the Arcadia of Georgia, will catch life from the chisel; and impart it durably to those, who shall give fresh and pure developments to *reason* advancing public happiness.

ARTICLE V.

Physiology of reasoning.

The impressions made on the senses become ideas; all individuality of the action is lost. We know not the abstract state of the encephalon in the acts purely mental. The immediate condition of all these acts, according to M.

* Tristram Shandy.

Richerand, is a stream of arterial blood freely impregnated with atmospheric oxygen, jetted by the heart into the midst of the encephalic substance. They depend directly upon the force of formation, or the assimilation of foreign alimentary matters into the cerebral substance. The continued action of the mind, as in declamation, stimulates this force, and the cerebrum attracts derivatively upon itself an undue quantity of the nutritive blood. In this state, the nutrition of the other organs is partially suspended in favour of the brain—state alone in which great thought can be produced.

Accordingly, if a stimulus be applied to any other organ, as food to the stomach, which will antagonize this derivative movement to the brain, the mind is instantly unmanned—shorn of its power. All powerful achievements of the mind, great discoveries, have been made on an empty stomach. The Muses aliment only on the thin air of the mountain, and the Castalian waters. Newton and Mendelsohn studied hungry, and fell from their meditations into a state of partial death and insanity, from which it was difficult to arouse them. Boerhaave only took food enough to prevent disease, secured a permanent derivation of nutritive blood to his brain, and felt that angels were administering his ideas to him from Heaven. It is only in the hot focus of the plastic attraction of the brain, to which the fuel of the arterial blood unduly rushes, that the soul stirs abroad in all its strength, and the sciences grow.

By this, we may understand the influence of the passions on reason noticed in the last article. They stimulate the organs, which the *ganglionic* or *trispianchnic* portion of the nervous system supplies with functions. These organs, thus stimulated, disturb the equilibrium of the circulation, concentrate on themselves the repairing agent from the brain and other structures. In their abnormal excitement, the nutrition of the cerebrum is lowered, and all the pure acts of the mind enfeebled or annihilated. It can now only see through these organs, which reflect what light it has left.

Thus she, who smites the lover, no longer appears to him in the perfect reality. His heart exhales thick clouds, and

he beholds her only in the prismatic colors. By these colors nature monogamic consecrates her to his care and affections; and thus, by sweet delusion, her own reality, she pushes forward the great bark on the ocean of time, in which the individuals of all our generations are the passengers.

The full action of reason is held in suspension by the plethora the passions produce in the internal organs, tending, in their perseverance, to disorganizing phlogosis. It promptly recovers from their temporary excitements, but in the chronic diseases they produce, it remains permanently weakened. Cervantes knew nature, who represented Don Quixote *lean, gaunt*; the *skin dried and hard*—the mere *burnt cinder* of the flames he nourished for Dulcinea del Toboso—she herself, a mere wench, who could fan wheat, and handle heavy meal-bags.

ARTICLE VI.

Distribution of reason throughout the living scale.

Philosophers continue to make great distinctions between reason and instinct. But why give generic names to the different manifestations of the same thing? Is it not more conformable to observation, to think there is a peculiar reason allotted to each order of organic existences, which guides them on the course of life; by which they are enabled to accomplish the various acts that fill up the measure and end of their being?

Incidentally, already, I have adverted to some of the phenomena of brute reason. In all the races, this reason appears to be in relation—to be modified especially to accommodate the various capabilities of motion of the external organs of creatures. It harmonizes with the entire organization, but especially with the external mechanical parts. Or, in other words, reason appears to be distributed throughout the zoologic series, according to the general organic types of animals, but bears special relation to their exterior forms, the immediate achieving instruments.

Accordingly, had the horse the reason of Canova, he

would not have hands to use the chisel on marble like him. Had the lamb the claws of the lion, his teeth would not tear, his appetite receive, or his assimilatory organs digest, the prey, he might take.

The use of all perceptions is the end or good the organs can make out of them through achieving volition—attribute of all life. The internal senses illuminate the good and the evil of the objects which stimulate to these perceptions, and the reason impresses direction on the voluntary acts. The external perceptions, the internal, expressed in the acts of the voluntary instruments for conservation, guide on the course of life, and fill up individual destiny.

A perception isolated from reason, which would have nothing to accomplish in the animal, whose senses had originated it, would be a *lapsus* of nature that cannot be. Every perception, as every organ, therefore, is a part in the end of animal being—is a part of reason; and reason must vary in creatures, as vary the senses and the instruments which achieve the end of sensation. Can they do less than we? they have fewer or less perfect instruments. Can they do more than we? what we cannot? they have special instruments.

Reason is the sovereign force in animality. “A certain philosopher,” says M. Virey, “had scruples whether he should ride or walk.” He observed his horse’s forehead sloped more suddenly back than his own, leaving to him the superiority of reason, which authorized him to mount, and ride. Reason has the natural right to govern. Will rulers ever understand it so? It is its supremacy alone written on his uplifted countenance, *vultis sublimis*, which bestows on man dominion among his inferior fellow-creatures.

SECTION VIII.

IMAGINATION.

FROM *imago*, an image—*imaginor*—I conceive, make, or feel an image—a representation.

It is not so easy to speak successfully of this faculty—this beautiful enchantress of the soul in poetry, painting, all the graphic arts. The pleasure or pain the mind feels in forming images of absent objects, cannot equal what it feels in their immediate perception by the senses. The pleasure then with which imagination ravishes, must consist in the infinitely greater number of images it can present at the same time; and in remodeling them, so as to strike us with novelty, presenting new and unperceived relations between things. By this remodeling power, Byron has struck at the purity, sanctity of the nuptial couch, planting in it an invisible dagger, if he has presented outward nature in more beautiful light—Bulwer and Byron have wrought over murder and robbery—the black spots in human nature—with attractions sufficient to extort the unwelcome admiration of mankind. In this respect, this faculty can operate energetically to the good or evil of the world.

Most of the metaphysicians consider imagination principally as a species of memory. It appears to us the limits they assign, are much too narrow. All the perceptions of the external senses are its materials. These it can modify at pleasure, and shape into shadowy worlds, presenting to reason new fields of activity. Thus it conducted Homer, Virgil, and Dante, into the shades below, and produced an account of those gloomy realms, the senses could read. It elevated Milton to the Empyrean, and led him into the Presence, where “no eye can look and live.” Through its high inspirations, he dared to clothe the face of the Almighty, with the expression of sentiment, and his lips with words—to roll out his chariot of war, whose “flaming wheels shook Heaven’s everlasting frame;” and compose hymns for the Seraphim.

—“ Thee, Father, first they sung, omnipotent,
 Immutable, immortal, infinite,
 Eternal King, the Author of all being,
 Fountain of light, thyself invisible
 Amidst the glorious brightness where thou sittest,
 Throned inaccessible, but when thou shadest
 The full blaze of thy beams, and through a cloud
 Drawn round about thee like a radiant shrine
 Dark with excessive light thy skirts appear,
 Yet dazzle Heaven, that brightest Seraphim
 Approach not, but with both wings veil their eyes.”

Aided by it, he sung the “martial arms,” the war of Heaven, angels the combatants; made them utter speeches in the dialect of their high spheres;—unloosed the tongue of Satan; breathed on him thought’s ambrosial form, which caused the infernal vaults of fire to ring with the most impassioned eloquence.*

Essentially architectonic, this faculty is the life of poetry, gives to all language, oral or written, its animation, to eloquence its fire, peculiar touch, and, to all the works of art, their grace and beauty. It is the only power by which intellectual man is permitted, in some little degree, to walk in the footsteps, and rival his Divine Creator.

It is possessed in very different degrees by different minds; men are very unequal in respect to it. It can exalt or depress genius. Some men it guides in the career of glory; some, as an *ignis fatuus*, it leads to the dungeon; some, to riches and honor; some, to poverty and degradation.

It is the kind, the cruel, the beautiful mother of fable. In the hands of Prometheus, it stole fire from the caldron of the sun to start the pulse of Pandora. In the sound of Orpheus’ harp, it brought up Eurydice from the Stygian shades

* In the high regions to which imagination soars, it appears to have its limits. If not so, why should great geniuses, such as Milton, copy one another so closely as they often do. After the second battle between the Greeks and Trojans, compare Homer’s account of the forthcoming of Jupiter’s war-chariot with that of Jehovah’s by Milton. Milton often falls in so closely with Dante, as to have the appearance of a translation. In his Dante, Boyd has pointed out many of these fac-similes of thought. Komstock, who passed over the same topics, is more free from them.

into open day. It forever mocks the parched lips of Tantalus with water; inflicts on him the torments of eternal thirst; rolls up the smoking summit of Tartarus the stone in the hands of Sisyphus, punishing with ceaseless toil.

It is an energetic, fearful power. Its voice can strike at once the blow of death; and almost rob the grave of its victims. It can exercise a most energetic therapeutic agency in disease, or in lingering sickness, disappoint recovering health, and lead the sufferer slowly along through gloom and despair to the sojourn of the dead. Æsculapius cured diseases by making verses for them, as often as by medicine—*Sunt verba et voces, quibus hunc lenire dolorem possis*—Horace. In the Iliad of Homer, the blood of the heroes was staunched, and life recovered by the singing of songs. Music, according to Dr. Mead, relieves the bite of the Tarantula in the Apulian Isles. According to Pindar, Chiron, the Centaur, by some verses, removed enchantments. Theophrastus says, “the sciatica is cured by the magic of poetry.” Cato puts down some words for the reduction of luxations; and Varro some, as a certain cure for gout. All antiquity had great confidence in the sanative powers of imagination. The honey made by the bees in the tomb of Hippocrates, cured diseases throughout all Greece—a superstition, which probably attaches to honey till this day. And we know Apollo was the god of medicine as of imagination or poetry.

Imagination can seize doubtful victory on the field of battle, or lose it after it is won, by inspiring cowardice. It can displace a virtuous sovereign; vacate the throne of a great people; and put on it a worthless tyrant.

It worships at the altar of God; frolics in Pandemonia; administers in the Cabala, Orgies, Mysterious Rights. It expands its light beyond the universe, illuminates the sane, the insane; creates new senses for enjoyment, suffering. Sorcery, vanity, superstition, hope, ambition, fanaticism, enthusiasm, bigotry—all the propensities, passions of our nature—swarm after its heels; lick the dust, and pay homage.

It is a great original! In the clouds it erects palaces of

ivory and gold; lofty seats of honor and pleasure; gives to the trump of fame a louder note, fixes new suns to shine on flowery, silky worlds; the winds with softer, sweeter breath to blow. It framed the great shades below; put fire to the waters of Cocytus; spread out the Elysian Fields; covered them with fruits and flowers; banished winter—How melodious its voice!

——“Elysium shall be thine, those blissful plains
Of utmost earth, where Rhadamanthus reigns.
Joys ever young, unmixed with pain or fear
Crown the whole circle of the eternal year.
From the bleak poles no winds inclement blow,
Mould the round hail or flake the fleecy snow;
But from the breezy deep the Blessed inhale
The fragrant murmurs of the Western gale.”

But whence come the resources, power, dominion of imagination? It has, as I have said, at its disposal, all the ideas derived from the external senses. The operative materials are principally the same as in reasoning. Reason separates, unites them accordingly as their prototypes or external causes are separated, united in nature. It modifies them according to the rigid order of nature. Reason properly conducted, and truth, therefore, must exist everywhere in indissoluble union.

But imagination separates, combines—modifies—these ideas according to an order it sets up and establishes for itself. The truth of imagination is their faithful separation, selection and union according to this order. This is the truth of poetry, romance, the works of the fine arts—the truth covered with starry garments, with so many charms, and fascinating delusions—so popular in the actual epoch.

But since error and falsehood are deformity, and can never please, this order of imagination copies, follows after the order of nature. Thus faithfully copied, the philosophy, truth of poetry, and of fiction derivative, are not less true than that of the philosophy, science of nature, whose pure truth is the representation of the phenomena of the world as they really exist.

The truth of reason, I may say, is nature's, of imagination man's stamped upon it. Imagination, therefore, like reason, is governed by the laws of nature. If the truth of imagination does much evil, it returns in compensation, and does much good. It would be impossible to strike the balance between the two, and not leave an amount in favor of the good. It animates and sustains reason in its long and arduous flights—holds up to it the garlands, the crowns—burns it with the hot rays of glory. It pushes at the wheels of science, arts. Without it, reason—all the faculties would be plunged into gloom, into a mournful, lifeless solitude—hibernal darkness.

In the darkness of great antiquity, when David and Isaiah sung, it poured forth its greatest splendor and beauty. In a thousand songs, and other forms of thought, streaming down the smoky talus of time, it comes in aid of virtue, patriotism, anthroposophy, charity, humility, the giving a cup of cold water to a disciple, religion—and in the heavy showers, it lets fall from our eyes, washes away, and cools the burning anguish of sorrow. It often rallies hope to dispel the clouds shutting us up in darkness, which despair had been fishing up from the bottomless deep. It burns with a brilliant light on the brow of humanity by the side of reason.

A great amount of imagination wild and beautiful, since all antiquity, has poured up from the East, and overspread Europe, the world. This continued long the country, where it manifested its greatest natural vigor; and it was here where it reigned, came the inspiration of Heaven. But since the sword of the Saracen has cursed, it has remained there unproductive.

I know not that brutes possess this faculty. The people of different countries, as individuals, differ very much in relation to it. Like reason, it is modified by climate, locality, food, manner of life, disease.—But imagination geographical, civil, medical, is proscribed by our limits.

CHAPTER XIII.

SECOND ORDER.

THE PASSIONS.

FROM *passio*—*pator*, I endure, suffer.

Some philosophers, divines, moralists, metaphysicians, delight to contemplate man, as composed of fierce, explosive, heterogeneous elements, ever tending, ever ready to lose their equilibrium, and fall into open disorder. They present the moral field of human nature tented for perpetual war. On the one side, they array reason; on the other, the passions. The great prize, laurel, to be won or lost in this perilous struggle, is *happiness*. As long as victory librates on the side of reason, as reason holds the reins of empire, the cause of happiness is maintained; but when the passions are victorious, the reverse.

This view is vicious—fabulous. The fundamental principles on which it rests, are not those of our nature. It personifies reason and the passions; makes of each a separate and distinct being; it then compares together, and presents them in the mutilated relations in which it forces them to appear. Reason and the passions are not separate, independent entities. This is the error, and the view itself poetical, not philosophical. It ought to be abandoned.

Man, who wears on his brow still the faded image of the Deity, is not a compages of divellent, untempered, disordered elements. He occupies, enjoys in all his being, the elevated places, the high grounds of his world; and when he would see, he must look down. *Tollitur ad sidera vultus, et infinitivum spatii orbem*. In power he is a definite quantity operative—designed to be operative in the midst of nature—an integral part of his world reciprocal in action. His forces balance against themselves, and against those of the universe. Look at him moving in the great orbit of his ages. At one time some of his elements, forces, are in the excess, at an-

other, in the defect of action; but in the great equation of their movements, like the astral bodies in the equation of time, they maintain equilibrium; and man's identity, uniformity, are seen in the great life of these ages.

If you would behold him in his true colors, in what he is, you must look at him not only in his solitary, individual life, but in the great flights of time. Here he shows in some small variation of light and shadow; but in his radical being, he is ever immutable and the same. If it be not so, when has it been, that he has not raised his altars to gratify his *natural* theosophy? His temples of worship are the oldest, most costly, magnificent monuments, ruins of the world he has inhabited. If man, in his reason, in his passions, has not always loved himself, loved man, what is the meaning of the urns, mummies, sarcophagi, tombstones, mausolea, which have descended from the greatest antiquity, and which will continue to descend? When has the good Samaritan not been passing over the earth; that one mortal has not rejoiced on seeing another rejoice, not wept, on seeing another weep; that pity has not moved; sorrow spread like contagion; tyrants, and abusers of mankind, been cursed; the benefactors of the species honored; good and happiness loved; evil and wretchedness hated; that war has not brushed, devastated; epidemics, raged and slaughtered; peace and health returned? Man is both morally and physically unchangeable.

It is in this fixed identity of his being, by their literary compositions, labors of art, men of ancient times continue constantly to live over again in evolutionary posterity, to whom their works come. Had Burton,* Cervantes,† Sterne,‡ written at the time of the Trojan war, they would have come laughing, and frolicking all the way down ages. Baxter's Saint's Rest, and Bunyan's Pilgrim's Progress, would have excited solemn reflection and sentiment; and the works of Sappho and Corneille, as they partially have done, would have marked the way with tears.

* Anatomy of Melancholy.

† Knight of La Mancha.

‡ Tristram Shandy.

It was ignorance at first—the love of hypothesis, system since—that ever could have represented human nature, against all the facts I have mentioned, as composed of mutable, rebellious, repulsive forces; and seen this strife, these everlasting combats, between reason and the Marmadon passions.

This military hypothesis of our nature is more vicious than the hateful selfishness, the utilitarianism of Bentham,* or that, which shows man out on the scale of infinite perfectibility, revived principally in modern times by Helvetius.

The view we here question, it is believed, finds support in the expression of St. Paul:—"For the flesh lusteth against the spirit, and the spirit against the flesh: and these are contrary."† In other places this divine philosopher avows—"the flesh," or passions and instincts of our nature, are at open war with the reason of religion.

Since the affair of Eden, this is mournfully true; our passions answer no longer to the Divine Reason, who made us; and our own reason is incapable of their rectification. But we should feel a lively joy and gratitude, that there is "a way for our escape;" and, that through these *very passions*, which are supposed to be proscribed, condemned, we can feel the light, the love, which guide us on this way; and, at the remembrance of its piteous, melancholy story, are permitted the pleasure of sorrow, humility, obedience.—Man, forlorn! has lost the facilities of pleasing his Divine Creator; the flower of his obedience has faded, but heaven still looks after, calls him. He is worth something yet. If the face of him which looks upward, has faded in brightness, and discords; he harmonizes with his world, its brightest ornament, and with himself, in all his being's faculties. Through his passions he can feel his Creator, and the "price" with which he is "bought." And religion straightens out the warped parts of his being, as pure philosophy purges his soul from the blemishes of ignorance.

* Principles of Morals and Legislation.

† Galatians, 5—17.

SECTION I.

CHARACTER, END AND USE OF THE PASSIONS.

To illustrate a preceding part of this work, I was compelled to anticipate much of what would properly fall here?

Some of the passions, as joy, gladness,—expand the vital movement, or are accompanied with an exaltation of life; some, as grief, despair,—concentrate this movement, are attended by depression. In the last terms to which they can be reduced, the passions are but the soul itself. They are its manifestations arising from the particular agencies, influences of the organism. They are impressed upon it by stimulations from without, are the clouded exterior garment, if I may so express it, it wears in its sojourn of matter; and the vital exaltation or depression, which accompanies their displays, depends on their intensity, as on the values of the functions of the organs on which they fall.

The external senses, as already, furnish us with ideas *simply* of external objects; the internal senses distinguish between these objects; appreciate the good and the evil: the passions are neatly the modifications of the mind, which accompany internal sensation so distinguishing, appreciating.

In the original constitution of the world, it would appear, the influences of matter tend equally to good and evil, to life and death. Hence we have senses stationed on the body's exterior to observe its various forms; interior senses to appreciate their influences; a voluntary, muscular system, and a will to court, draw these influences upon us, or repel them:—A law of nature has been given, by which we love life and fear death, active forces in directing the movements of the will. This love and fear in some sort form the two great foci, in which all the other passions play. The good is all those things material or moral, whose stimulations tend to the pleasure, increase, and conservation of life; the evil, those of a contrary tendency. The passions, therefore, primary elements in the will's actions on the

voluntary muscles, form the medium, through which the mind sees the good and the evil of things: Or as the eye sees the various colors of objects in the different sorts of rays they reflect, so the mind sees, as I may say, the evil and the good in the rays of the passions, which things transmit.

If, accordingly, a sphere exists in space, of which life is an appanage, where all the properties, forces of external objects are in perfect and happy unison with this life, the passions there, so far as the constitution of this sphere is concerned, would be a superfluity. They physically could have no end to achieve. The power of perceiving and approaching—or sensation and volition would only be necessary. But in a constitution of matter like ours, where the forces tend equally to death and to life; and, where the continuance of life depends momentarily upon the management of these forces, the passions are necessitated to fill up the measure of successful conservation.

These forces, therefore, which librate for and against life, profound the law of its love, and the fear of death, which nature has planted deep in the heart. And from the opposite tendencies of these forces, as philosophers, we may conclude, that matter here is achieving ends in the great economy of the Divine Creator, in which our organic being forms no part, has no concern.

The great springs of action, the passions, occupy a high rank in our being. Nature having intrusted to them a part of the means of conservation has inspired us with interest and admiration for them. To history, poetry, fable, they give the coloring. As imagination fashions into form, they paint. It is they, we feel, when we read. By their light and shadow, they exalt, depress the mind's intellectual activity. After Maro had labored many long years on his heroic poem, despair came, and tempted him to consign it to the fire: but the hope of success revived, snatched the immortal *Æniad* from the flames, and sent singing down time sweet-voiced the swan of Mantua. Sustained long upon the uplifted wing of the tired Muse, the passions,

which had sustained Ovid through the gloom of chaos and change of forms, suddenly expanded a beautiful light, when he sung:—

*Jamque opus exegi : quod nec Jovis ira, nec ignes,
Nec poterit ferrum, nec edax abolere vetustas.
Cum volet illa dies, quæ nil nisi corporis hujus
Jus habeat, incerti spatium mihi finiat ævi :
Parte tamen meliore mei super alta perennis
Astra ferrar ; nomenque erit indelibile nostrum.
Quaque patet domitis Romana potentia terris,
Ore legar populi :—*

How nimbly and beautifully does thought trip along under the sunny warmth of such feelings. All the passions, which impress vivacity on the attraction of organic formation—or urge the vital forces without pushing them beyond a certain degree of intensity, enlarge the boundaries and rectify reason by imparting to it force; and, in its turn, reason comes in compensation, rectifies, restores equilibrium to the passions.

Thus every part of our moral and physical nature reciprocally acts for the mutual good, and benefit of the whole:—All the organic forces come in aid of the moral, the moral, in aid of the organic; and, in our economy operate for mutual support. Man is an assemblage of organs, faculties—a geometrical quantity in the universe—every part reciprocally essential, useful to every other part. Every sense, idea, passion, feeling, faculty; every bone, tendon, muscle, nerve—all the organic forms with their separate properties—have their appropriate place, combine in their great action for conservation as to what is without, and for one another's use and good. The pure idea of man, moral and physical, is that of the calculation of force against force, the end, to secure their equipoise. In this respect with all animal existences, he is purely geometrical in his framework, and, in his statical relations, differs not from the bodies in space—from all anorganic bodies.

Embarked on the inland sea of time, such is man in nature—man on his way to his Creator; and he will go up to

be reviewed in the totality of what he is—judged, rewarded by the acts of his reason, passions, impressed through his will on the muscles, bones ; or “according to the deeds done in the body.”

But to proceed—The passions, as intimated, exhibit a great variety of shades, and vary greatly in the kind, as in the impetuosity of the force, they expand upon the living tissues. Hence they have many names, and admit of several classes, as inclinations, affections, propensities, appetites, wants, sentiments.

They all disturb the equilibrium of the great function of innervation, and radiate their force on special organs. Some radiate simply, and suspend more or less completely the living action in the balance of the organs, they do not directly affect, as grief, terror, despair. Others affect the tissues in relation, and then expand the vital energy through all the organs, as pleasure, joy. Passions of either physiological character in the excess of violence, by the heavy blows they strike on the tissues in relation, may break the general unity of the functions, and as we have noticed, already, produce instant death. History shows, those, which have the greatest power to expand the general life, have killed in this way the most frequently. Daubenton could not survive the pleasure he felt, in being called to preside over the Senate. Sophocles receiving a crown, which had been adjudged to him, died amid the applauding shouts of the multitude. Our patriot Jefferson expired the 4th of July, the emotions inseparable from this day in our history, bursting in upon him. Under the joy of obtaining his liberty from Louis XIV, Fouquet died immediately ; Leibnitz's fair relation, on opening a chest of gold bequeathed by her uncle ; Chilo and Diagoras of Rhodes, on beholding their sons crowned at the Olympic Games ; the Spartan and Roman mothers, on seeing their sons return from the battles of Cannæ and Thrasymenus, where it was understood, they had fallen.

The sad passions ordinarily destroy more slowly by bringing on hypertrophy, and disorganizing phlogosis of the organs, on which they concentrate their force.

It was the ambition of the Stoic philosophy to conquer and subdue the passions ; of the Peripatetic, to honor them ; of the Epicurean, to derive enjoyment from their rational cultivation. It is strange that early Christianity did not favor the Stoic in preference to the Peripatetic creed. But after all the rectifications of reason ; after all the lights, which have been shed on the passions ; and the care of Heaven, it is still mournfully true—

—Vide meliora proboque :
Deteriora sequor.

SECTION II.

PHYSIOLOGY OF THE PASSIONS.

MANY good philosophers have erected the *phrenic* or *epigastric* centre into a sort of *sensorium* for the passions. Already we have noticed, all the facts of psychologic physiology seem to point to the cerebrum as the sole seat of the mental phenomena.

It appears to me the whole phenomena of this phrenic centre, constituted by the trisplanchnic or ganglionic nervous system, which, it has been thought, entitles it to be regarded as a distinct seat of mental operations, may thus be succinctly stated. An object of pity is presented. Let it be the

“ Poor old man,
Whose trembling limbs have borne him to your door ;
Whose days are dwindled to the shortest span.”

The eye gazes on the shrunken, wasted form, and on the garments of decent, virtuous poverty, which partially cover it against the action of the piercing winds.

But it is only the tattered garments, the pale, shrunken visage, the wasted, shriveled, tottering form—the physical man—painted on the retina, which the eye sees:—sees through the mind's eccentric reaction upon it. and in consequence of the picture or impression being made. And were there no other senses, but the eyes, and those like them, the

mind could perceive nothing more. All objects would indiscriminately be presented to it in a relation or light purely physical.

But while the mind, in this case, reacts upon the eye, in consequence of the impression transmitted to the intracranial focus, and sees the physical man, it likewise, by a law of the organism, reacts synchronously upon the organs under the epigastric centre, affects them for perception, as the eye is affected for vision, and sees the moral man. This last reaction of the mind produces a fulness, a vital turgescence of these organs—lavishes innervation upon them; and there is a lively sensation felt in this centre, as there is in the eye beholding. The mind perceives by this centre, as by the eye. The only difference is, outward causes affect the external senses for perception, while the mind itself affects the internal organs.

The mind thus, by its reaction stimulating, arousing to activity the epigastric centre, manifested by this vital turgescence, effect of over-innervation, sees the holes in his worn-out garments; feels the winds blow that benumb him; tastes his coarse, unsavory food; sits by his cold fire; lies on his hard bed; writhes under the neglects, repulses, frowns, scoffs, he has received from hard-heartedness; contemplates his flesh wasted from age, disease, and hard living; his strength gone before he has reached the grave, and wants pressing him hard—beholds in him the moral man, the man common to all the species.

Let any one interrogate himself—the eyes, the external senses, are incapable of such noble, sublime vision. Through the mind's reaction on their impressions, they only perceive the physical qualities, attributes of material objects. They look at man as at other corporeal forms; see his size, tangible figure, complexion. It is the internal organs, stimulated through the mind's reaction upon them, which are the instruments of this great moral vision—which behold what have nor color, length, nor breadth; but will endure the separate elements of his immortal nature.

May I be forgiven. I delight to contemplate this emotion of pity, on which we have touched. It unites us to all sentient beings; extends to all ranks of intelligence; and pro-

claims a moral nature in all. What an immense society it forms, in which man in all his generations, constitutes only a single member, individual!

Like a lone star, it shone long on the earth with a feeble, doubtful light. Often it scarcely dared to speak, or urge its precepts. They perished in the bosoms where they sprung; and often its voice was forbid to be heard. Wars bloody and cruel raged long; homicidal engines and dungeons were constructed; cruelty became an occupation, and the groans of the sorrowing, the depressed, an idle blast of wind. In aid of the wronged pity consigned to mortal bosoms, Pity descended from Heaven in bodily shape. It spoke with authority. It expanded a soft and beautiful light. In this light the ambitions, glory of men dropped to the dust. In this light men maddened. Lazarus became more noble than the war-bearing Alexander, and all the Cæsars; "a cup of cold water," a piece of bread, things of more brilliant, magnificent titles, than the thrones or sceptres of sovereigns.

But to our inquiry. It is evident, when an object impresses any of our senses, we are not conscious of it, until the mind, as I may say, visits the sense affected in the reaction of its material organ. If the object be calculated to awaken emotion, as the poor octogenarian above, the encephalon, under the influence of the mind, directs one movement to the sense affected, by which the object is physically felt, and, at the same time, another to the epigastric centre, by which it is felt morally.

I cannot discover any thing more in the facts of this mechanism. In the busy scene around us, a thousand stimulations constantly act on our senses ineffectually, as the ticking of the clock, the ringing of bells. They are only perceived, when the eccentric reaction reaches the actuated sense or senses. Very often, too, it happens, objects capable of awakening emotion, are perceived, when this same reaction does not reach the epigastric centre, or affects it so feebly, that they are not morally perceived. This will more frequently happen in great cities, where such objects are more numerous.

The difference, then, as already between physical and moral perception is, in the one case, the perceptiferous movement begins in the external senses, and is completed by the reaction of the central organ on these senses, while in the other, this reaction is double. Besides the one to the operative senses, there is, at the same time, one transmitted to the epigastric centre, which affects it in the same manner for moral, as external objects do these senses, for physical sensations.

The encephalon, therefore, is the sole seat of the understanding, the *epigastrium* or tissues of the *ganglioso-abdominal centre*, acting in the place, and supplying the function of an organ of sense. To these tissues, as to the seats of all the other senses, already noticed, the mind refers the sensation, which consigns them to the rank here given—the rank of senses.

The order of nature here is peculiarly beautiful. It is here in this centre all our moral wants are felt; and by it are read out to the mind in the great public auditory of the common sensory. And it is here too in us are felt the same wants of all others, read out in the same auditory. Here they are felt in this prodigious medullary instrument which urges the attraction, that organizes, impresses the morphologic characters on the tissues, fights against death—impels by its sole force all nutrition, life.—Felt at the very home of our own wants, producing vital congestions in the subordinated organs; choking the breath; filling the heart to breaking; wringing, clapping the hands; pouring out the tears. If nature had no other tongues, or voice, these were sufficient for men to know—they were formed for mutual support, to feel for one another, and participate in a common destiny—brotherhood.

It is here in the elaboratory of this internal, nervous organ, nature carries on, displays her marvellous alchemy;—that she prepares the chaste fire, which burns in the maiden's blush; the ice, which freezes in terror; the blight, that wrinkles and withers in scorn; the meteors, which flash and dazzle in eloquence:—It is here she forges the hot flames,

which consume the lover, waste the politician, drive the warrior against the point of the enemy's sword ;—that she weaves for despair the raven-colored habiliments ; distils the sweet delusions of hope veiling sorrow in moonlight ; that she draws forth the sighs, and all the tears to fill the cup of grief.

In consequence of the fulness, painful distensions, the passionate cause in the organs co-ordinated with the nutritive, nervous system, it becomes a pleasure “to feel for another's woe ;” to uphold under the weight of affliction ; exercise pity, charity, be tender, merciful, forgiving ;—actions, sentiments sanctioned, recommended by Christianity—stars in the clouded firmament of human nature shedding a beamy light ;—actions, sentiments, which the advancing sciences are fast tending to establish as the only true philosophy in the world—the ripe fruit of civilization perfected.

We see, therefore, the reason of the law so unprofoundable at first, by which the mind, beholding humanity suffering, explodes, lavishes the sensorial power on the internal organs paining, disordering their functions. It is to compel us to cut loose the purse-strings in sight of the wretchedness of poverty ; to put our hands softly under the head bowed by the weight of merciless affliction, grief, accumulated ills.—It is the voice of the Almighty articulated through these organs, equalizing the good he bestows, illuminating reason on the ways of his Providence.

When we obey this voice, our laboring, suffering organs, styled sacredly “*the bowels of mercy, compassion,*” soon regain equilibrium ; and a placid tranquillity, with a sense of ease, pleasure, steals upon us. None can get beyond the reach of this law, except by constantly violating it, like Nero, who to amuse for an hour the hungry furies, which gnawed him, could set Rome on fire.

It is not only in the perception of objects competent to stimulate emotion, that the reaction of the mind is felt on the *epigastrium* in the transmission of the nervous power, but likewise, in the recollection or conception of them. The emotions attendant on conception, after they have had time

to become illuminated by imagination, are frequently more vehement. Thus, often the want of courtesy, or a slight insult offered, which passed for nothing at the time, when fancy has flung upon it the light of her magic lantern, becomes a matter of rage and revenge.

It is this power of fancy over our emotions, accompanying the perception and conception of things, which engenders the soft and tender light of time;—the light in which we behold the relics, the tombs of our ancestors; the monuments, arts, letters, labors, remains of antiquity. When we first begin to read the languages of early men, it is in this light of the heart we behold them; by day, by the dim taper at night, wet with our tears the pages, which record their doings. It was by this calm and lachrymal light, in royal sports, the Grecians celebrated the ashes of Patroclus; that the pious Æneas instituted games to honor the tomb of his father Anchises, and, in the trumpet-blast of eternal fame, sent to endless posterity his beloved name.

This light consecrates, hallows, whatever it touches, and expands round it a gloomy joy. Thus a spot, where a fellow-being has been laid, or long since visited by a friend, has the power of inspiring this peculiar sense, and imparting a special value. Madame de Staël visiting Rome, went to the tomb of Metulla, when this inspiration called forth, instantly, the most tender and brilliant touches of eloquence, in the eulogium she composed on the spot. Davy seated on the ruins of Pæstum, Volney, and Chateaubriand on those of Athens, Sparta, and Carthage, under its power produced the most perfect form, the living beauty of thought, in the reflections they made. Having ascended in Egypt the great pyramid of the plain, “here where I sit, on this very stone,” cries Savary in his heart’s fulness, “sat Strabo, nineteen hundred years ago. Here I behold, in the description he has left, now before my eyes, that he saw the very same things which I see.”

It is in this tender light of time—the light of the heart, animated by the sweet touches, delicious tints of imagination, we contemplate Iphigenia, Cassandra, Laura, Eloiza, Bea-

trice, Eleonora—all the fair human forms of fiction and reality which catch the breath of the same life in all ages, and inspire admiration, pity, and sorrow. Its full value can only be appreciated by great geniuses, as Shakspeare and Boileau. Men, however, without ability, by its sole power, frequently procure interest for their works. Finally, it is this light, which lends to solitude a substantial part of its charms; to which Zimmerman, St. Pierre, Fenelon, and Rousseau, have imparted such deep interest in their writings.

But if some of the passions expand the vital movement to the excess of producing death more or less suddenly;—if some, through the local inflammations of the tissues on which they fall, conduct slowly, burn life gradually away, to the cold edge of the sepulchre;—if some, through their mild organic influences, exalt reason, imagination; fill the soul with tenderness, pity, commiseration; with the gloomy, mournful joy of solitude, antiquities, nostalgia pouring out the tears; radiate the bright light of hope, or darkness of despair;—finally, if some of the passions are manifested by concentrating, and maintaining the nutritive blood on the epigastric organs causing *cerebral asthenia* tending to *atrophia*, thus weakening, deranging reason, there are others, as anger, revenge, through their sudden action on the heart, cause this same blood to rebound back in excess into the midst of the brain, maddening reason, and all the intellectual faculties. The blood transmitted, accumulated suddenly in the *cerebrum*, the sensorial power or nervous agent is abundantly evolved to excite and sustain voluntary, muscular movements. The whole organism, charged now with this explosive, energetic power, the eyes flash, the muscles contract, the fists clench, the teeth strike, the blood vibrates rapidly in the face alternating the color. Hypersthenic spasmodic, abnormal phenomena, are developed. Thus nature, in the rage of anger, hatred, wrath, yields the force of revenge—force, which gives to the voluntary muscles preternatural strength and activity in combat. This same rage is manifested in animals, by the contractions of their skin, the erections of their bristles, feathers, crests on their head; and by the threatening motion of the martial arms of nature.

Of all our emotions, sexual love, perhaps, is the most complex; and exhibits the greatest variety in its physiology, psychology, and pathologic phenomena. It has figured most in the world. Having consigned to it the duration of the species, nature has armed it with prodigious, energetic force. According to the Greeks, all antiquity, it can bend all mortal and immortal powers except the Fates, and reigns in the Olympian seats, as on the earth. If it burns in human bosoms, it can reduce the world-shaking Jove to an humble suppliant at the feet of beauty, snatch the thunderbolts from his hands, and an infant child can sport with them.

A philosophic account of the passions with all their shades; their influence on the living economy; comparative estimate of their moral forces, modified by country, climate, civilization, displayed in the reality, as now in romance and civil history, would be inestimable.

Philosophers, who study them merely abstractly, or without the knowledge of their dependence upon the influences of the organism, differ very much as to the display of their mechanism.

A. Smith* supposes, in the exercise of our sympathies, we go out of ourselves, take possession of other persons, and thus feel for their infirmities as for our own. It is true, we feel for others in a measure as for ourselves; and all human emotions, except in callous hearts, are truly contagious, or have an energetic tendency to expand their movement. This going out of ourselves, however, of Dr. A. Smith, can only be the state of the organs and functions I have described, responding to the common sensory when excited by objects of commiseration, or objects calculated to stimulate emotions.

Many others, who are merely philosophers, offer very different accounts of the phenomena mental and moral over which we have just passed. St. Augustin resolves all our emotions into the perception of the order and design of nature. Sir Joshua Reynolds, the Abbé Winkelman, Hogarth, provide for them special senses. M. Diderot refers them to some great law of "the moral constitution," or to our per-

* Theory of Moral Sentiments.

ception of relation; Hume and Bentham, to our sense of utility, and Mr. Alison, to "a train of thought," animated by imagination, which differs not very fundamentally from Lord Kames.

The true knowledge of physical man lies in his structure—is to be sought for in its general and special relations, subordinations; in the conditions of health, temperament; in the changes of disease, ages; in the reciprocal dependence, influence, movements—unity of his mental and organic constitutions. The true knowledge of man, both moral and physical, can only be sought for with success, in the philosophy of his organic formation, and Book of Heaven. His passions are the outward vestments, in which his mind appears—shades impressed upon it by the modifications of the nutritive portion of his nervous tissue, by special organs, and must vary as these organs, his general constitution, varies. Accordingly, like every thing sublunar, the passions are subject to the power of change. Country, climate, locality, health, disease, age, food, avocation, temperament, education—must have their influence. In the same individual, some are developed sooner, some later; and die, disappear in the same proportions. But we cannot touch on these interesting topics, and of the individual passions, must content ourselves with treating only a single one.

SECTION III.

PASSION OF THEOSOPHY—CULTUS NUMENIS—OR RELIGION.

MAN has not been left without a force of central movement. By a constant, progressive motion, he is borne onward. Futurity presents to him two great foci, where burns the wrath or the love of the common Creator, as the terminus of this motion. The impetus of religion bears him to the seat of the Divine love, of ineffable pleasures;—of rebellion, disobedience, to the sojourn of the Divine anger, of endless wretchedness.

ARTICLE I.

Philosophy of religion.

Religion, derived by Servius from *religando*, *restraining*, *binding*, is compendiously, the admiration and love of God. In all its modifications, love is a passion of some energy. When violent, it tends to exaggerate, to exalt unduly the values, excellences of the objects on which it falls. This quality of love is evidenced by the labors of many archeologists, who place the remains of classic antiquity—their arts, sciences, letters, improvements, civilization—upon a level, or above those of the actual epoch. It is very manifest in the love nature formed for the union of the sexes. Thus, for instance, he who loves ardently and tenderly, sees nought in her who is the object of his passion, but beauty and perfection—the qualities which please, assimilate her to the higher order of other spheres. Her idea lives constantly with him, penetrates all his sensations, expands a new light, radiates her beauty, perfections, on inanimate objects; and nature, in consequence, presents to him a more sweet and smiling aspect. Cold repulses, neglects, successful rivalry, time, waste and dissipate the confusion of the epigastric and cerebral functions. He beholds her again, and estimates her by the pure light of the senses. But with all that makes her pleasing, he is astonished at his former conceptions—at the meteorization of his soul, and the bright coruscations which flashed upon it, the mechanism of which I have already explained. Accordingly, the same objects, when seen by the light of the heart and by the light of the external senses, must show in very different proportions.

With the love of life, nature has consecrated to our affection whatever tends to its welfare, and continuation. Love therefore, may be defined, *the primordial, active union, tendency of our mind to all objects, whose forces, as the means, operate to the duration and well-being of our existence.* Our love is always in proportion to the excess or defect of the conservative action of these objects. All other loves flow

from the original love of life. This love, I may say, was the governing principle in the original theory of human and animal formation ; since, in place of this love, had that of annihilation been given, all creatures, by the active forces they wield, could, and would have sought instantaneous extinction ; and suspended, *ab origine*, the progress of generations in all species. But by this love left free to act, they exert, balance their forces against their world ; and measure out a duration of existence varied in all—accomplish the end of their first idea.

But if, in the scale of love, all objects librate in proportion to their tendencies to maintain and perpetuate existence, the Supreme Being, who is the original giver, arbiter, perpetuator of life, who is infinitely exalted above all, *perfect in the conservative force*, must be infinitely the most admirable and lovely of all.—And since beauty, excellence, perfection, form the media, through which love acts on objects, he must likewise, above all, be infinitely the most beautiful, excellent, and perfect.

According to the fundamental principles, therefore, upon which love operates, through the love of life he has given us, by his beauty, life-conservative power, by all his qualities, he must stimulate, challenge the supreme love of man ; must concentrate upon himself a balance of admiration and love, which outweighs infinitely all that can be excited by, and lavished upon, the objects he has created. This is necessarily so, since these objects are only the means, and are subaltern, secondary in their action in the perpetuation of the life, of which man has the innate love—love, which is the primordial element of all religion. And if he does not so admire and love his Divine Creator, it is perpetual, absolute demonstration to the sceptic, infidel, forlorn ! that the harmony of the moral universe has been temporarily blotted ; and that the love mortals cherish in their bosoms is a flower which has sickened and faded ; unworthy, and disproportioned to its object.

If contrarily our species had been formed with the horror, hatred of life, or love of annihilation, and constitutionally

restrained from gratifying this love or from universal suicide, it is manifest they would fly from whatever had a tendency to cherish and perpetuate this life; and would love, be attracted by whatever had the power of destroying it. In such an order of human nature, above all the objects of the universe, the Giver of this life, *cæteris paribus*, would be the most consummately ugly, repulsive, and hateful; and in place of love, madness, hatred, and anger toward him would have constituted all religion.

Accordingly, the innate love of life, which arrays the Divine Being with ineffable perfections, attractions, analyzes as the first principle in which religion begins; and "eternal life" is the reward, brilliant crown, it holds up to its votaries in scenographic Heaven. To intelligences like we, doomed to the desolations of temporary death, what reward could be so sweet, so appropriate; could so gratify this ardent, pre-existent love of life diffused at first through our dust? life, which we cherish on the course of time, and grasp after dying;—life made perpetual in futurity—"eternal life"—rescued from the devastations, spoliations of time and the world, alimanted by the love of God, Heaven, permanent in immovable being? The wickedness of mortals is insanity! their disobedience, rebellion—blasphemy, outrage on themselves!

But it is not simply the love of life we prize; but life in union with happiness. Happiness is the effect of the action of good on life. Good may be defined, the totality of the conservative force of life. This force to us organic, exists diffused throughout the visible world, but has its *punctum saliens* in the Divinity. Love, I have said, is the active tendency of our mind toward objects which possess this force; beauty is the manner of our beholding them; religion is our love of God—or tendency of our mind to him—founded on the innate love of life; God, therefore, who dispenses the conservative force of life, is love, beauty, and goodness; and the action of the love of religion is reciprocal—holy, blissful idea!

In the last elements to which we can thus reduce the

idea of religion, I cannot see any thing beside. This rapid reduction shows our race was formed for religion—formed to tend to the love from which they first came—nor can we tell how the “forbidden fruit” could ever have been tasted, or loss of Eden caused. In the explorable universe, we know no similar example—know no order of being beside, which has violated its first motion, and become dynamically wrong. The beautiful children purely material of the same universal Father, who wander, and cry after him in space, still appear to follow in the same footsteps he first appointed; and reach after him in all their far-shooting rays. The earth we tread, visible mother of our organic being, is one of these, which follow in the direction first impressed. Is it because we are less material than they, we have sickened in the first motion; become undynamical; lost our proportions, and our way in the universe—have fallen into the tangent of sin; sent up a smoke before our eyes to Heaven; and now weep in the gloom we have made? But if we show our being wrecked on the coast of time, and are tending wrong, Christianity makes us dynamically right to play forward through eternal duration after; and to sin now, constitutes the *guilt double*. Such contemplations, however, belong to an order of conception far above our mind’s force.

But how can I sinful, decent, expatiate on the holy philosophy of religion, which is the philosophy of our love of God, love blemished, violated, and his reciprocal love!—love forfeited by disobedience. The philosophy of Christianity cheerful, prospectful, is the philosophy of this love restored. But for this restoration, man ought ever to have continued dumb in the Divine Omnipresence; but now his gratitude has a right to be vocal, to expatiate over the field religion occupies; and he again can look toward his Creator; feel himself love, and be loved.

The qualities, properties of the Divine Being, manifestable to the reason of a contemplative mortal, stimulate all the great and sublime emotions of his nature; and make his heart speak. Is it antiquities, that have charms for him?—The lonely rock, which stands in the woodlands where he passes,

has a voice to call to him, and a bearing that vibrates on his soul. "Ah!" he cries, "the rage of how many seasons, of how many centuries has this rock withstood! Time gnaws on it in vain. Since it has been here, how many of my race have needed sepulchres; how many generations, nations, empires, have been entombed in the gulf of time!—the lustre of beauty, the brightness of glory, have faded; the noise of fame quieted; eternal recollections, become obli-vions! The loneliness, darkness of years, the noiselessness of desolation rest upon it. The lone survivor of what has been, it is the witness of what has perished of the world—of its devastations, changes. The ruins it has seen, it has passed through, sanctify, consecrate it holy; and with awe and veneration, press it upon his heart. The place of its presence is religious, holy."

But it rests on ruins itself—the ruins of what existed before it. O, old of the old! It carries him back to the chaos of the world, and plunges him into the abyss of material nothingness. But He! who placed it here in these woodlands!—oh! The infinity, antiquity, of Jehovah smite him, and shrink the volume of all time, and the world into an invisible speck. The oldest moments of time engraven on this rock, are the same, as if they had just been; the rays of the light of the first day of the world, tender and juicy as the living grass, that streams in the wind.—The age so great, that nothing after can ever become old. All antiquity is but an affair of the present hour; the desolations of the world, but the course of nature, the changes which happen in this hour. O abyss of antiquity, Jehovah! eternal endlessness backwards—forwards! Purity! holiness! praise—fear—homage! O deep, dark sea of the Almighty bottomless! where no bright wheel of matter ever turned, no year ever dipped the supple wing, or wrecks of time are found!—monumentless! unshapen in thought! nameless.

But his heart, as his understanding, is too weak for the emotions of this last conception. The touch of the Infinite One to his intelligence, is sublime and fearful, awakening solemn adoration.

In place of antiquities, is it longevity and happiness he admires—God alone holds the disposable treasure of all life and happiness. Do riches, glory, beauty, grandeur, magnificence attract him? Infinite space is the store-house of wealth, and the grandeur and glory of the world can only come from pre-existent grandeur, glory ;—and if, as I have said, the love of all earthly objects tend to exaggerate their excellences, values, by his love and admiration he can never reach, equal the perfections of God, whom we most reasonably are commanded to love with all our *soul, might* and *strength*.

The passion, sentiment of religion excites too the epigastric functions, but never shocks the vital equilibrium, or destroys by acute or slow wasting irritations. By its mild and equable excitements, it exalts, dignifies reason; cools, softens the friction of the other passions, that frets away vitality; and tends essentially to perpetual health and longevity.—Religion physiologic restrains the fierce forces which totter in ascending the steep of life; and by a steady motion, lets us down safely into the tomb, and the other world.

A mortal truly loving God, the soft light of his heart radiates out on the landscape of the world; and it shows to him with sweeter, more lovely attractions. The Divine Omnipresence animates, imparts a special value to all objects his senses perceive. The idea of God, the idea of his heart, lives in his soul; smoothenes the ruggedness of calamity, affliction; and snatches the sharp arrow from the bow of death. He has truly the Malebranchian vision—sees, enjoys all things in God. The Divine Omnipresence, momentarily conscious of us, which we so little appreciate, think of, comforts him. It is truly consolation. “Ah’!” cries a celebrated sea traveller, his heart breaking,—“in these regions so remote from all human habitation, what mean these new skies above my head, and these big bright stars, that glisten so about the austral pole; on which the eye of no man before mine ever fell!—and these rocky shores, these lonely wastes so wild, so frightful, never pressed before by human feet—

isolated from all that is of man, that looks of man! But the God of Europe is the God of these solitudes, of these skies, and these stars. He is all that I see, that I know here."

ARTICLE II.

Religion civil, or in relation to the Species.

The characters of the Divine Being, as we have just seen, fill the soul of man with amazement, wonder! and strike his heart with holy awe and veneration. He is naturally, essentially adorable, glorifiable—causes homage. Religion, accordingly, is the most sublime, as it is the most sweet and charming sentiment of our nature. All history shows, it has been coeval with the origin of all people, society. Judaism, Egyptian, Grecian, Roman polytheism, Christianity, Fohism, Islamism; the worship of Woden, Brahma, Ormuzd or Oromasdes, Baal; are the forms, in which it has appeared in its greatest majesty, and shone with the most brilliancy and glory on the world.

Islamism, fostered by the climate and genius of Arabia, robbed from Christianity all its worth and beauty; and rose in blood by the eloquence and military prowess of its cunning and deceitful founder. It is due to mankind, it should go down behind the red banner of war its winding sheet; and the political aspects of the actual world so portend it.

Christianity sprung from the love, the reason of God; all other religions, from the reason, imaginations of men. It was the religion of the Jews, among the most ancient by enlightened people on earth; it has ever since existed only among the most enlightened nations—it is a civilized religion. Its abstract truths are of a philosophy the most vast and sublime, expressed in language the most elegant and beautiful, demanding for their comprehension high intellectual powers. Its precepts are commentaries on things, which strike alike the common practical sense of men. It is emphatically the religion of the Caucasian or white race, among whom it first appeared. All other races or colors of existing men have, always have had, religions more or less

peculiar to themselves, accommodated to their genius, circumstances, to which all historical records concur in testimony. These religions, if we may exclude that of the Chinese, have figured but little in history; and figured principally as matters of mere curiosity. The people to whom they appertain never elevate their reflections, but persevere in barbarism, and never achieve any thing worthy of the remembrance of future generations.

All philosophers bestow on this Caucasian branch of our species a decided superiority over the others—place it at the top of intelligence in the scale of zoologic man. This superiority arises from the comparatively more perfect organization of the pneumatic organ, the more happy conformation of the nervous system, and general structure, the facial angle being from 85° to 90° .

If the whole race is susceptible of well-marked divisions, time has stamped on the Caucasian variety itself several distinctive peculiarities. History finds it, as the others, occupying a principal sojourn in the early civil divisions of the earth. This sojourn comprehends Europe, Asia Minor, Arabia, Persia, India to the Ganges, and Africa to Mauritania. It is composed, according to M. Virey, “of four great branches or primitive families.” These families, in the sequel of ages, formed many great nations, who have established many mighty empires; and preserved each their original language, manners, religion; and carried them with them into the countries where they emigrated, or established dominion by conquest.

The first family is that of the Arabs, which comprehends the Bedouins or Arabs of the desert, the Hebrews, Syrians, Chaldeans, Druses, and other people of Liban; the Egyptians, Phœnicians, Abyssinians, the Maures, Morocains of Boreal Africa.

The Hindoos on this side the Ganges compose the second branch—the people of Bengal, the Coromandel coast, of the great Mogul, the Malebarians, the Banians, inhabitants of Candahar, of Calcutta.

The Scythians and European Tartars, more modern,

compose the third branch, in which are to be included the nations which swarm at the feet of Caucasus, about the shores of the Caspian Sea, many nomades; the Circassians, Georgians. The Parthians, Affghans, Cossacks, Usbecks, Muscovites, the Turks descended from Oygours and other Tartars, Huns, Ostrogoths, Bulgarians, belong to this family.

All the Celtic or Teutonic families, all purely European, with the two great branches, the boreal and the meridional, constitute the fourth and last division of this great Caucasian family.

The very names of these people are the names of history—of great events. It is they from all antiquity, who have hurled over the earth the hot thunderbolt of war; and agitated the affairs of this world. Restless, fiery spirits! it is they who have built cities, empires, kingdoms, thrones, and destroyed them.—Who pull the sun of civilization out of the horizon of the world, and set it up again. Who at once are the fathers, and the descendants of the Alexanders, the Cæsars, Attilas, Alarics; the Othmans, Amuraths, Tamerlanes, Washingtons, Bajazets, Buonapartes, Newtons, Miltons, Lockes, that appear, and become visible forever from the high hill of future ages. They scar deep the earth where they sojourn, and leave durable monuments behind. The other varieties of men, are the olive-colored, the Ethiopian with their modifications, who continue in the eternal slumber of their mental faculties; and, in the revolutions of their generations, leave little other than their bones behind them. Their countries continue a wilderness.

It is, then, not from mere opinion, but from facts, that philosophers have given to the white race, shot off into the families I have mentioned in the early annals, the decided superiority of intelligence—superiority which, besides the facts of history, is evidenced by the greater excellence of organization. According to these facts, it is from this race solely have originated all the great arts, sciences, inventions, and improvements, which establish dominion over the laws of nature in favor of civilization and public happiness.

If it be not as I say, to mention no more, where are the records, archives, monuments, of the black and olive-colored men, which show the treasures of their genius, their intellectual achievements? What does posterity owe them? What have they done worthy of a name? Where are their time-honored?

During the thousands of years past, the negro has sat under the shade of the palms, by the side of the cool rivers of his meridional country, which wind under the branches of trees laden forever with delicious fruits;—sat where nature pours the most varied, sweet inspiration, wooing to reflection; and still he is the grossest savage, and in his thoughts, his manners, calls brutes his near kin.

Contemplate now ancient Egypt in the same land, occupied at the same time by a branch of the Caucasian stock, his neighbors. Think of the labors, the eternal monuments of thought and reflection left:—the Zodiac, in which since the sun and all his planets have travelled:—seas excavated in the dry sand, rolling waves built to facilitate commerce: mighty empires, pyramids, temples, other immortal works of art. Thought cannot know, feel such thought without approaching to sacred homage.

And the red man, our Aboriginal, stem of the Olive race, who roamed for centuries this country in which I live, the traces of whose footsteps are scarcely erased on the very spot, where I now sit and write:—This beautiful country! amid the tops of whose majestic oaks and poplars the Ausonian breezes have ever played, fanning the heat of summer: Trees, whose roots sink deep amid waving grass and clustering flowers:—This country! which lifts up its undulating surfaces to drink the light, mother of sweet fruits and colored flowers; whose limpid streams wind through sunny hills down the shade-dark valley and song of birds—resorts, ancient dwellings of Hygeia—the rolling waters falling everywhere softly on the ear tempting rich mellow thought and contemplation: Country!—whose extensive valleys afford shelter for herds and wild beasts against the darting rays of summer; in the deep cerulean curve of whose sky

the moon looks so rich and beautiful; behind whose amber clouds the golden sun goes down; and the blue tops of whose mountains inspire sacred awe pointing to the palaces above:—The red man I say—where are his hoary-headed, who survive all changes of the world immortalized by reflection? Where are the proud works of his hands? What are the venerable monuments, antiquities, he has left? Some pointed flints, fragments of coarse pottery; mounds of earth; heaps of stone piled on his bones; the country virgin as from the hands of nature, are these monuments. His archives are the living beech trees, in whose bark are rudely cut grotesque figures of the wild beasts he hunted, and destroyed, and her he loved.

Why has he done; left no more? Often I have had intercourse with the sages, the lords of his people. If you ask them of the country whence their nation first came, they shake their heads; of their history, it is a tradition, that extends but a little way back; of their religion, it is a giant spirit residing in the clouds, who wields the tomahawk above, and expresses his will in the roaring thunder. Why are his people so dark? Why has he, with the negro, and all the colored races not Celtic or Caucasian, remained in the first helpless infancy of nature; persevered forever in unmitigated barbarism, often starved, pressed by famine; animated by lawless ferocity, cannibalism, the great ideas, order of things—force of reason, unknown;—the excellence, beauty of noble virtue, the high, exalted sentiments of morality, religion, unfelt? Occupying countries the most capable of improvement, they have not improved; of affecting the heart, they have not been affected; of the most penetrating inspiration for reflection, they have not reflected.—People, races, too, who occupy so much of the territories of this world.

What answers can be given to these great questions, facts? For it is certain, after the general cataclysm by water, the Celtic or white families, who multiplied into nations, like the other branches of our race—the branches I describe here as still unimproved—all commenced at first, if we except the Hebrews, in ignorance and barbarism. The first light of

letters was kindled on the banks of the Nile, whence it has been dispersed through all countries—kindled by Caucasians in the state in which nature produces men—in the gloom of ignorance and barbarism. The ancestors of Manetho, of Zoroaster, Sanchoniathon, Orpheus, Linus, Homer, as all other gentile people, were barbarians. Who, then, when but little of the Bible was written or known, if the Bible be a question, taught Manetho history; Zoroaster and Sanchoniathon science and philosophy; Orpheus the knowledge of monotheism, the sublime Love, who created the universe a harmonious, musical instrument to sound this Love; and Linus and Homer the use of the lyre? The early civilized Assyrians, Greeks, besides others, in elegant and useful arts, discoveries, inventions, science, far excelled the Jews descended from the same stock, and who had Revelation. We know it was from the East that the workmen came to build the temple at Jerusalem; and that Solomon obtained the ships for the business, commerce of his kingdom.

Why have all noble discoveries, enterprises been alone due to the different branches of the Celtic or white family? The inventions of arithmetic, geometry are of Egypt; the origin of the alphabet is Egyptian, Basque* or Tudesque, of which history is doubtful. Why has one division of our race improved, originated vast political organizations, become civilized and happy: and why have the other divisions continued in the night of incorrigible, eternal ignorance, stupidity, barbarism and wretchedness? What answers, I say, can be given to these great questions, facts, but that these races which will not improve are born in natural dulness, heaviness—in an organic torpor of the soul—from which they never wake or stir?

I would not write aught against my race, or blot what nature has made fair. The order of facts, immovable in the course of time, write, declare these differences in our collective species;—differences attested by the observations of all epochs, attested by actual anthropographic history. And to inquire why these differences exist, is the same as to inquire,

* Vid. Juan Bautista de Erro—Alphabet of the Prim. Language of Spain,

why our stars respect the heliacal centre ; why the Pleiades in sisterly union wander forever in Heaven—things unthinkable. Gradation is a law of the universe. Some stars are greater ; some less. The cryptogame, in its formation, unites on one side minerals, on the other, plants ; the zoophyte, on the one side, vegetables, on the other, animals ; man truncating the inverted cone of organic vitality, articulates with angels. There are archangels, which implies less angels—there is a varying zoology in Heaven. Nothing is equal but God. But is it advantages of country, climate, &c., which make these differences in the different organic types of men ?

Physical and moral advantages.—Some countries from sterility are incompetent to supply the natural wants, and foster perpetual barbarism. In some sufficiently good, the genius of the people is depressed by military despotism ; and improvement, civilization, are effectually restrained. War and the sovereignty of war are great modifiers of the state of society. From all these modifying circumstances, causes, there are still white nations, which have made but a few steps from the cradle of nature. Their soul is a strong spring, which is kept bent, which, when these restraining causes are removed, invariably put forth the beautiful flowers of arts, literature, and civilization. The blood of the Georgian and Circassian slave reigns on the thrones of Egypt and Persia. Why ? Because knowledge is power ; and the ability to know, is available power. But our limits do not allow us to trace this mighty picture.

The American Aborigines lived free under their own institutions. They occupied a country, as we have seen, calculated in the highest degree to awaken, inspire genius were free from all causes which hinder or retard civilization, and yet they continued in barbarism. And whence does oppression come to the sable race, who tread the Afric soil, except from themselves?—the oppression of ignorance, essence of their nature—ignorance impregnable, durable as adamant in a country where every thing favors, urges to knowledge.

But since that knowledge has sprung up, is it education, social advantages, which produce the differences of which I here speak?

Education—social advantages.—Some of our Aborigines have been educated in the colleges of Europe, and of our own country. Like the early Greeks, who visited Egypt, and other countries for instruction, when returned to the home of their fathers, they did not teach, inspire their people with the love and cultivation of our arts, sciences, morals and religion. These exotics were uncongenial, foreign to them, were foreign to the national genius, unsuited to the public taste and manners of their people; and returned, says Dr. Franklin, “they fell in again with the way of their race.” Indeed, the light of our civilization, which has now been shining upon them for some centuries, upon the whole, has rather injured than ameliorated their condition. They have loved, preferred our vices more than our improvements. Their genius is the sterile mother of their arts, morals, religion;—of their unchangeable barbarism unfolded in the great action of time. They are the mellow fruit of their natural understanding; and all the exotic flavor and richness which may be imparted soon exhale and waste. Like the form of man they bear, their soul is not the soul of the white race; and since one species of trees does not produce the fruit of another, since all in organic nature is distinct, it would be unphysical, that they should bud, and bring forth the moral and intellectual fruits of this race.

In the negro variety among us, so long, so constantly and vividly impressed by our morals, religion and way of life, are plainly visible the stupidity, dulness, the disposition to cruelty and ferocity—all the outlines of the character of their natural or original state. In the young negro you behold these outlines developed in his appetites, inclinations, instincts, as strongly as they were in his father’s born in the wilds of the native country.

They are religious, but manifest generally a very feeble sense of piety, and of the sanctity of the sacred ordinances.

According to Dr. Moseley,* it was so in the West Indies. "Besides overseers," says he, "ministers were employed and sent out by the English to preach on their plantations." To encourage the negroes in religion, these ministers were in the habit of bestowing some trifling present, on the administration of their baptism. They took advantage of this custom, and some were detected in having been baptized many times for the sake of these presents.

Born in our families, grown up under the plastic force, the forming hands of civilization, they imitate in their actions, but in their hearts cherish a weak sense of its refinements. Occupying their place in the sanctuary, religion is a tumultuous, vehement, but evanescent passion. But few feel its steady force; and on the slightest provocation, often they display their feelings in ingratitude, unmerited vengeance and cruelty. The passions and instincts form the main base of their nature, in which reason is but a feeble element. With all the same opportunities as ourselves, their works of art fall far below common perfection. They are only bad, rude imitators, not designers.

Living in the midst of plenty procured by cares foreign to them, with their futurity always unclouded, they pass their days in gaiety, singing simple songs of loud and deep intonation with regular returning cadence. It is the present they enjoy manifesting but little anxiety or solicitude for any pleasure or gratification which necessitates diligence and the growth of time.

Travellers in their native country assure us, the torments of the future agitate them but little; and they stir principally when hunger, the wants, press them. This recklessness of futurity appears natural to them; for when abandoned to themselves among us, they neglect to provide for coming wants though protected by law; and tend rapidly to the natural or savage state. Despite the force of habits, of industry, of religion, whose tendencies are to soften, console the feelings; and forgetting the comforts, amid which they had lived,—the protection, pleasures, enjoyments of civilization—they

* Fevers of the West Indies.

sink down at once into their original barbarism, and walk no more with us. They are the strong bow of Ulysses, which, when the string is broke, becomes again straight. In all their unrestrained acts, developments of their sensibility, they constantly manifest the original principles, constitution of their nature. Time rains no poppies on them. Their civilized life is a movement against the movement of nature. Their generations evolve, and pass where sympathy moves, kindness consoles, religion softens, reason originates laws, honor gives dignity to sentiment, humanity wipes the tears—the light burns,—but they only reflect faintly, and never absorb its beams. The same distinctions with which nature has marked their external, organic contours, are scored deep, fixed inerasably on the frame-work of their minds.

It is manifestly the cares of which I speak, that comfort their days, sustain them constantly above their race's level, and impart such rapid motion to their increasing population. And when the events of the world sever them from these cares, and fling them on their own resources, in their misfortune and calamity, they must tend rapidly to annihilation.

The same peculiarities which mark the negro variety, modified, characterize the Aboriginal Americans. They too, as intimated, cannot relish, breathe freely in the moral and intellectual atmosphere of our civilization. Our philanthropic, tender-hearted religion has been borne into their wilderness. They have received it with distrust; sometimes killed* those who had brought it to them; and, according to Dr. Franklin and others, manifested a disposition to prefer their own. These peculiarities, modified in all, extend to all the permanent varieties of our species.

We have presented, in outline, one branch of the Olive, and one of the Ethiopic stock living our neighbor, living among us:—the one appropriating the vices arising from our culture, but refusing chiefly the benefits of it, and persevering in the savage life:—the other through necessity practising our virtues, our way of life; living our civilization, and falling into original barbarism, when this necessity

* Vid. Heckewelder's Narrative.

is removed. Let us compare, contrast with these two varieties of men, some of the white races, barbarians of Celtic or Teutonic origin.

Their comparison with the Pelasgi and early Italians.—These Pelasgi, nomades, in great antiquity penetrated into Greece; the early Italians, a predaceous band, into Italy. Each in their epoch established and practised gregiculture, agriculture, the industrious arts of life, and commerce. Each built cities, raised up barriers of defence; and with their swords marked the foundations of their empire on the extremities of the inhabitable world. At first they had no teachers but nature and themselves.

Contemplate these Pelasgi, sea-sprung, barbarian hordes wandering, when the gloom of tradition first began to brighten with the rising light of history, in the fertile valleys at the feet of Mount Olympus, Taygetus, Zarex—the valleys touching Epidaurus, the Sicilian promontory, Argolic gulf. Their food at first was milk, wild berries, and acorns, or a species of chesnut as Pausanias and Pliny believed. They waged exterminating wars against monstrous and ferocious wild beasts; and protected from their assaults their flocks and their bed-chambers.

Like that of chaos, primeval, universal darkness then hung on their moral and intellectual horizon. But in this darkness their hearts felt the pressure of wants. It is the wants nature originally impresses on man's internal organization, which stimulate the activity of his soul, and put his hands in motion—wants, which sigh after arts, inventions,—commands the grain to vegetate in the soil; cities to start up from nothing; the ship to sail; political order to come forth; the picture to appear on the canvas; the marble to start up from the quarry and live:—wants, which distinguish all organic existence from the mineral; and distinguish according to their numbers and activity. It was *these wants* they felt—*wants* which, when numerous and active, always necessitate, are always connected with, a strong and firm texture of the soul.

It is these wants which mark, on the calendar of civiliza-

tion, the degree, since from them originate all science, art, industry—all intellectual activities. It is upon them the forces of the external world operate, and in them the mind feels the charm of whatever it investigates—charm of all knowledge. This charm unfelt, indicates the feebleness as the fewness of these wants—*is barbarism*. The paucity of these wants in the distribution of nature, *is barbarism*, the barbarism which *continues forever*. The *lavishment* of these same wants is barbarism, which will soften, civilize by kindling the light of letters—*barbarism* of these Pelasgi, Italians; of all the white races.

In all the richness of their strength and numbers, these wants stimulated these nomadic Pelasgi. They gave themselves to study and contemplation; collected together the observations they had made; and drew forth order and form for the teaching of the Grecian children who descended from them. Their posterity following up, extending this order, by generalizing their ideas, arrived at two great conceptions, the algebraic x and y of nature's unknown quantity; or to two *eternal principles*, *matter* and *intelligence*—the one passive, modifiable; the other active, unchangeable. This discovery made, they produced the order of the universe. On the Empyrean, on the azure summits of their mountains, they fixed the palace of this original, sovereign Intelligence; personified the forces or laws of nature by which he governs, and subjected them to his will; and, in the discovery of the immortality of the soul, and other sublime truths, reached near as man can the source of sacred inspiration.

They diffused around them the excess of intellectual vitality, which they enjoyed. All inanimate objects soon breathed the living breath; felt in human language; and spoke. The arts came forth hand in hand smiling; tore from their humanity the hard and rugged covering of barbarism that had profaned it; threw round it the soft purple of another life; and it walked forth in charming originality.

The light of civilization thus originated, has darted with varied splendor over the heads of all generations since; and must continue. But it is only over the Caucasian families, the countries in which they have lived, to which they emi-

grate, its beams play down time. What interesting moments the world has witnessed! when this light kindled in these countries remote from one another, as in Egypt, India, Scandinavia, has blended its rays, as at the epoch of Grecian science, of printing.—But in all generations, the light falls in vain on the other varieties of our species. They still group—group forever in the first darkness of nature, and in original privations, hardships and wretchedness.

If, therefore, to the Olive, the negro varieties of our race, nature presented the earth a rude and wild habitation—a *place to learn in*—the same as to them, she presented Greece to the Pelasgi, and Italy to the first Romans. These, as all the families more or less have done, to which they belong, we see, have created civilization. They learn, originate, and teach it to one another. But the Indian, the negro, with all their respective branches, occupy still the same ground or nearly the same on which nature abandoned them to manage for themselves. They neither arrive at civilization, nor learn it from others, nor teach it to one another. Finally I repeat, what answer can be given to the great question of these differences, but that nature creating sense and reason has made the same variations in them as in the complexions and organic contours of the different types of men?

But for these inequalities of natural sense and understanding, all descriptions of men in good countries would alike approach near the same intellectual equilibrium; and barbarism and civilization could not exist together in the same geographical limits. Did these inequalities not exist, it never could have been proclaimed with truth, as did Hobbes, that “religion is a tale believed in one country, but disbelieved in another, is superstition.”

But if nature has made a difference in races, we see, on individuals of the same country, of the same lineage, the gifts of intelligence are bestowed with very partial hands, which constitutes it a glory to be a Racine, a Shakspeare, Pascal, a Rubens or Angelo.

The white collective race alone civilizes—unfolds its genius in sciences, arts and letters with various perfections. It is

with the genius of this race harmonizes the sublime theology—genius of Christianity—the race which has ever cherished it as one of its religions; and from the highest antiquity, brought it down through all the changes of the world.

REFLECTIONS

On civil religion, and conclusion of this work.

WE may conceive the entire system of the world to be animated by a progressive movement; and, since the forces which actuate it are definite, that its idea includes a limited series of events, or an eternal revolution through these series. The earth is passing through continual changes or revolutions of her surface. Her magnetic meridians have a motion which appears steady, and most probably depends upon the equable action in equal times of the general forces of the entire system—forces, which achieve the great progressive movement of the whole of which I have just spoken.

It is not reasonable that man should stand still where every thing around him advances. Like his world, like the earth he inhabits, he too is passing through a series of physical or organic revolutions, generations, in which the life of his species is constantly renewed, to nourish which life the earth renews her face. We are assured from the Bible, he will not have an eternal motion through these organic revolutions.

His mental and moral forces are less steady in the revolutionary action, and less defined, but nevertheless their changes are very observable. In these changes we may conceive, he will yet be presented in many new phases of his being.

The art of printing begun will augment the treasure of his general knowledge, give it an impulse forward through a great duration yet, and protect with good success against the causes, which have heretofore destroyed it, and brought on the world again barbarism. The use of gunpowder in battle will make war less destructive of life; snatch victory from brute force; and secure it to those who excel in the power of intelligence.

The art of printing will ultimately make felt the want of an universal language, and stimulate to its invention or adoption. This language, the public, universal depository of the ideas, inventions, improvements, sciences of all intelligent nations, to which each individual of society could have easy access, will consummate for the world the good of the invention of printing. When this great language existing shall collect together in one body, and present in one view all the discoveries, all the efforts of the reason of men in all enlightened countries, and of all ages, in the universal comparison of ideas, which will then become practicable, pure science and truth must advance, new arts rapidly spring up, inventions occur, discoveries be made unwitnessed before by all past time of history.

In the improvement of general knowledge, philosophers will look on nature with new eyes, and hold under the control of their intelligence a greater amount of her forces. By the improved light of chemistry soils may be composed of new fertility, which may transform—compel many of the grasses and shrubs now bitter and useless to produce the savory food of men, as the cabbage, the mellow apple and others have already been produced. The great forces, by which nature moves the machinery of the world, and carries on her labors, might be more successfully applied to human machines, inventions and the achievement of human labor. Philosophers would prescribe to executing mechanics the principles, on which they are to construct labor-sparing engines. The dynamical properties of matter arranged in the mechanic arts, according to the ideas of philosophers, would subdue matter principally, and place it under human sovereignty. In this triumph of intelligence, the improved arts would create new pleasures, new sources of enjoyment—remodel private and public happiness—ennoble and beautify the race in the earth.

In the progress of these happy ages, these philosophers might detect the laws of human embryogeny—might ascertain all the circumstances, facts attendant on the reproduction of a man or a woman of sublime genius, exquisite

beauty and perfection — ascertain in the initial formation what afterwards makes one individual a poet, another a mathematician; another a homicide, an idiot; one a handsome, another an ugly form. Having thus detected the laws which mould individuals, and fix their destiny in the world, they could prescribe formulæ to the legislators of the country for the enactment of civil laws to regulate intermarriages; and by these laws or this means correct the errors principally of organic and moral formation, which are now so detrimental to the public good and necessitate so many penal laws to restrain. By this philosophical regulation of intermarriages, a prodigious amount of physical beauty, and of moral and intellectual perfection, might be imparted to the species; and men produced according to the wants of society, its appropriate elements.

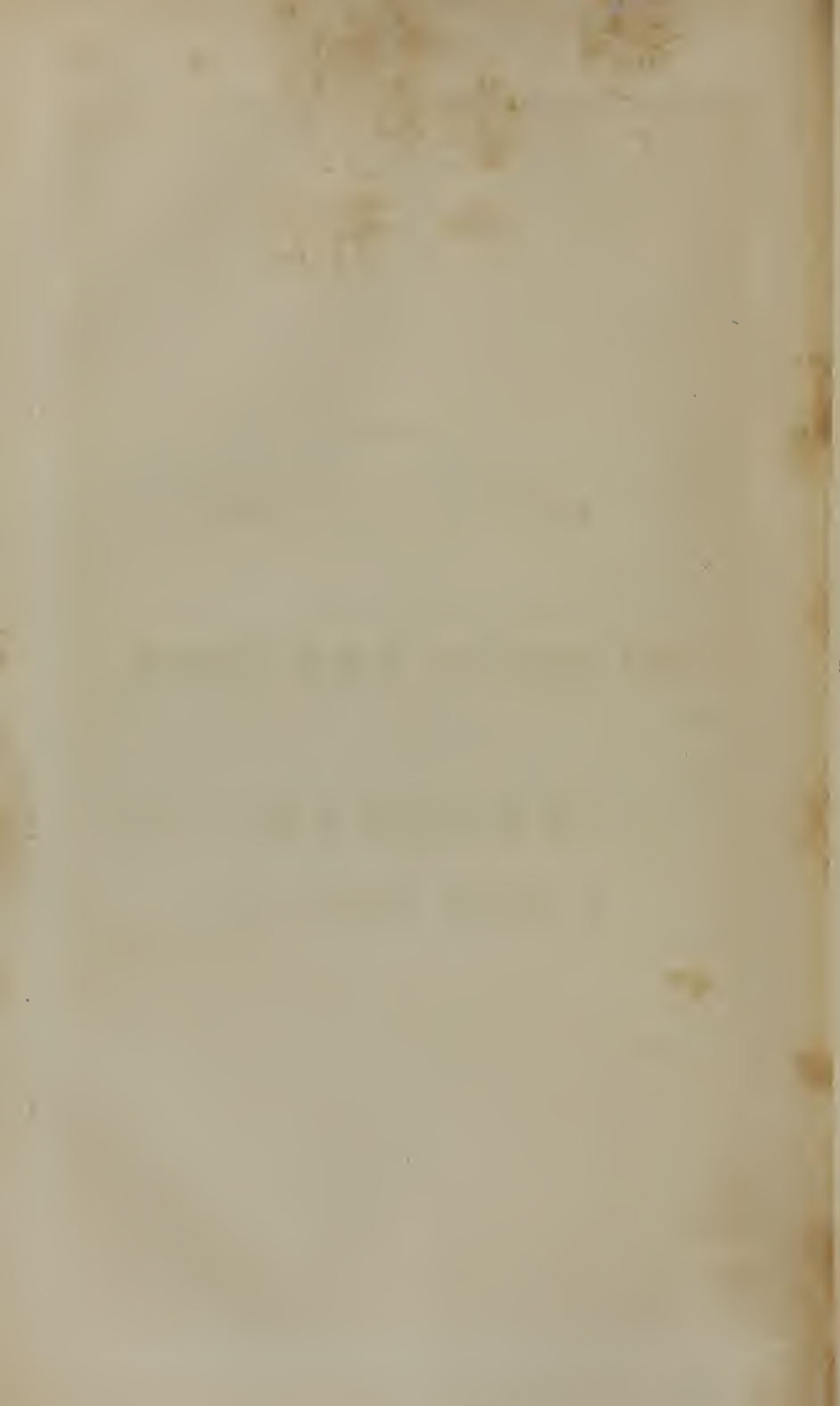
The adoption of an universal language would stimulate energetically to the public amity and peace of mankind. For the want of such a tongue, the time we now spend to perfect our minds in the study of learned languages of the living and the dead, would be devoted to the study of arts, literature, and general physics, which would impart additional velocity to their movement, and help on to perfection. In the peace, to which such language would tend, the population of the world would increase; but the increase of knowledge, by the means of soils I have mentioned, and by other means, would supply bread for a limited duration. The arts, *which would be*, would fight against the boreal cold, the equatorial heat, the lapideous, the water-covered soils; and subject a greater portion of the continents than heretofore to human inhabitation.

When this duration expired, and food and room were wanted, the people of the enlightened countries would begin to drive the unenlightened races before them; and, when their own numbers should be equal to the then inhabitable lands, the branch of the Caucasian stock the most improved, by the irresistible power of intelligence, knowledge, would push, drive out of the earth the other branches with the Indian, the negro—all the other races, *ebauches* of men; and

take the sole possession. If not effectually restrained, suppressed, in the future fortunes of the world, augmenting science must build the sepulchre for all the human races ruined in their stamina by improper food; improper intermixture, malicious, predaceous climate; by sojourning long in unhealthy situations; and who cannot improve. Since it is the greatest of all moral forces, and these races oppose nothing to uphold its equilibrium, it must ultimately fall upon them, and destroy; and yield all countries to the possession of a single race.

In this advanced stage of society, by the power of investigation, the problem of human nature or proportions of man with the universe, would be solved; and the passions mainly freed from all that is wrong. The knowledge of the divine workmanship of the world, or general physics, in their high attainments, would become so many branches of theology. The meaning of sacred revelation fully made out, the sublime contemplations of men would present the Divine Creator as living on the earth, and receiving homage, the supreme pleasure; and his pure knowledge cover it, as its waters. All the exquisite beauty, attractive forms of thought, would be presented in the flight of poetry; and the abyss of ages, to which men reluctant go, become a field of open flowers.

A BRIEF
MEDICAL ACCOUNT
OF THE
MIDDLE REGIONS
OF
GEORGIA.
BY JOHN B. GORMAN, M.D.



TO
DANIEL B. SEARCY, M.D.,
OF MONROE,

IN DEMONSTRATION OF THE AUTHOR'S HIGH ESTEEM AND GOOD WILL, AND OF HIS
SENSE OF YOUR ATTAINMENTS IN THE

SCIENCE OF MEDICINE AND BRANCHES OF GENERAL PHYSICS,

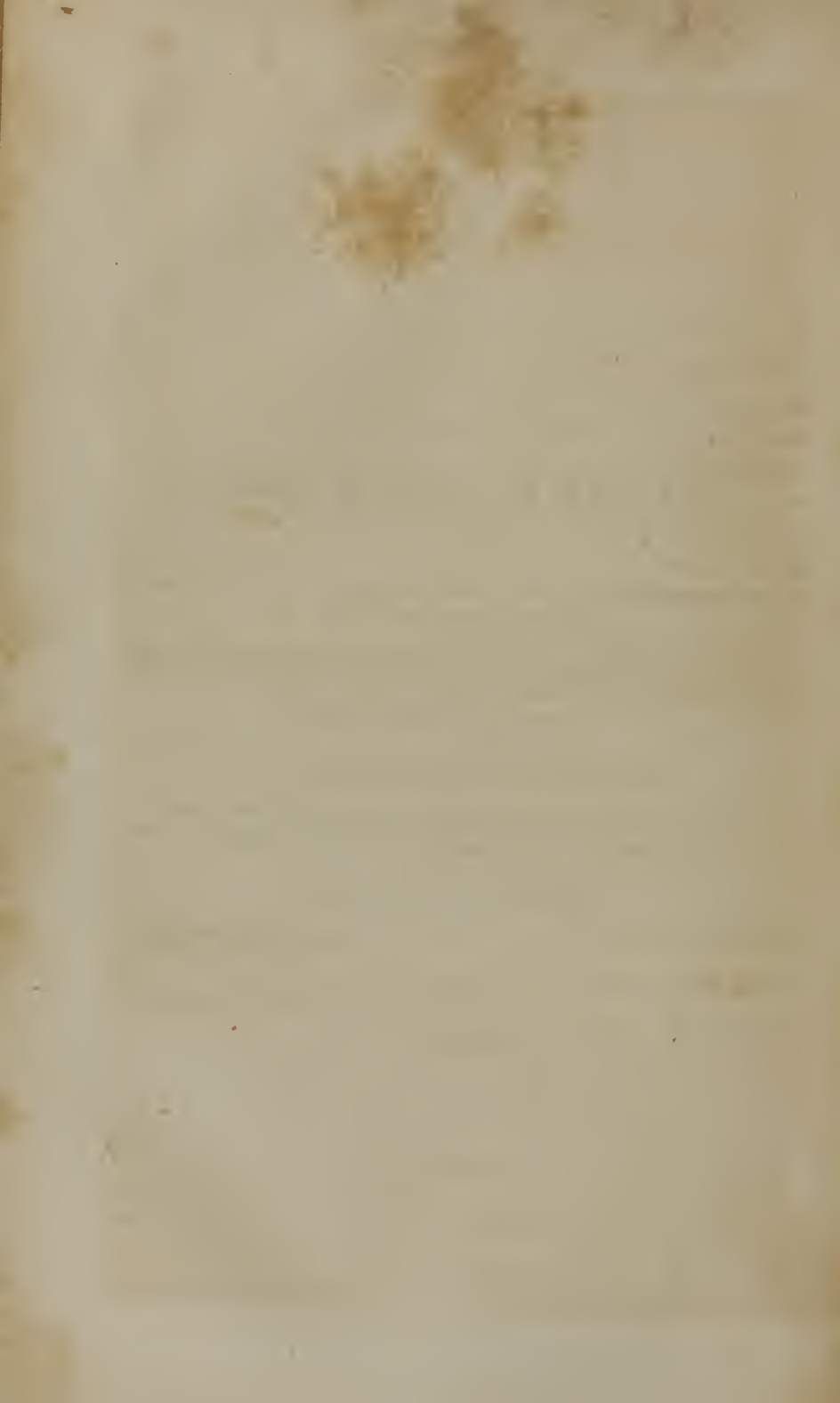
THIS OPUSCULUM

ON THE FEVERS OF OUR COMMON COUNTRY,

IN THE STUDY AND SUCCESSFUL TREATMENT OF WHICH, YOUR ACTIVE LIFE HAS
THUS FAR BEEN SO USEFULLY SPENT, IS, WITH YOUR PERMISSION,

RESPECTFULLY INSCRIBED,

BY THE AUTHOR.



MEDICAL ACCOUNT.

AFTER the example of the illustrious physician of Cos, those who write the history, and explain the nature of diseases, have found it useful, for their more perfect comprehension, to study the physical geography of the countries where they appear ; the food, clothing, arts, avocations, state of civilization or general condition of society. Since all external agents, the passions, state of the mind, modify the organic constitution of man, and disease is only a particular condition, this study is indispensable to the enlightened knowledge of disease. All the several topics connected with it are comprehended under *medical topography*.

CHAPTER I.

TOPOGRAPHICAL MILLEDGEVILLE AND THE MIDDLE REGIONS OF GEORGIA.

WITHIN a period little less than half a century, the spot on which Milledgeville now stands, with a large area of the surrounding country, constituted the hunting ground of the aboriginal people.

SECTION I.

TRADITION AND HISTORY OF THE SETTLEMENT OF MILLEDGEVILLE.

LIKE the people of ancient Greece, our fathers came across the water, moored their ships, and reared up their

rude habitations nearest the sea, where the soil promised the best harvest. On the one side fell the roar of the Ocean; on the other, extended the illimitable wilderness—lonely, frightful solitudes, where roamed the fierce wild Indian. Living in constant fear, mothers then watched round their cradles and fathers wrought near their homes.

As the population increased by birth and emigration—ages began—the settlement made, continued to expand, and extend out into the back country driving the savages before it, until Savannah, Augusta and Louisville in succession became the most convenient seats to the central mass of the representative people, where statesmen assembled to enact laws, and regulate the affairs of civil polity.

Finally, during the administration of Governor Milledge, a new grant for lands was obtained from the Indians, when it was observable the population was still advancing rapidly to the West. It now became the policy of the state, as well as a matter of economy, to permanently locate the seat of administrative government in the centre of the acknowledged limits of Georgia. The maps showed this desired locality was circumscribed in the country obtained in the late grant. According to the tradition, legends of the times, a number of commissioners was ordered out by the state to explore the new lands, and select the permanent seat, where public rule should be established; and whence hereafter *in perpetuo* laws should emanate.

Unlike those, I may say, who in great antiquity explored the wilds of Latium to fix upon the site, where Long Alba, the eternal city of Lavina, should be built—

Ad flumenis undam
Litoreis ingens inventa sub illicibus sus,
Triginta capitem fœtus enixa jacebat
—Is locus urbis erit, requies ea certa laborum—

these commissioners had no unerring signals given to point them to the spot. Sound judgment and good discretion their only guides, they wandered long through green savannas, and the dark shade of endless forests. For it was in the gay season, when nature shows in all the beauty and luxuri-

ance of her summer verdure, they set out on their exploring expedition. After many lonely wanderings through these wild solitudes, they fell in with the country on the western banks of the Oconee river, whose clear waters in these days, reflected the deep blue color of the sky. Here many localities presented charms, and solicited their preference. Pursuing their course, soon they came where the land rose up before their eyes beautifully undulating; and hills on hills crowded the distant horizon. The waters gushed up cool and limpid from the virgin earth to slake the thirst, and flowed away in pleasant streamlets. The growth of the soil evinced great fertility.

Animated by the scene presented, and convinced of the suitability—"Here," cried they, "is the spot we seek. Here cheerfully shines the sun; the breeze here freshens in its course; and in the distance, the dashing rivulets murmur over the sloping rocks. Yonder extends the fruit-bearing soil to the declivity of the distant mountains; and yonder are the Oconee waters to bear the products to the Atlantic traffic. Here are all the natural elements of the city whose place we are to determine. These are the appropriate seats of the lofty houses of state, of the temples and altars of liberty." And it was here the foundations of Milledgeville were laid, and the city reared up on a spot similar, and in situation resembling that of the city I have mentioned—*ad flumenis undam*.

SECTION II.

PHYSICAL GEOGRAPHY.

WHETHER it be the indigenous products of the soil, or the structure and formation of the country, which are contemplated, the subject offers a deep interest to the natural philosopher and geologists.

ARTICLE I.

Natural history.

The natural history of our own, of all the southwestern states, remains principally unexplored, and consequently, is but little known. The states immediately north and west of us are in the same condition. The zoology is nearly the same in all. But our phytography with that of the country still more south, is rich and varied.

Our natural history has yet to take its flight. The age of philosophy musing has not come; we have not yet built the altars of the great sciences. The passions always on the advance, demand from nature first their gratification; and snatch greedily from her her rich and precious gifts. It is they, which have proclaimed with imperial authority, "riches shall have the first honors, shall constitute the primordial elements of character, dignity, personal importance," and, unholy, have erected the standard to measure the stature of thought. It is they, which have thrust their profane hands into the bosom of our virgin country, grasped after the great cotton staple; and, in a few short years, the phantom soil has begun to disappear unveiling hideous sterility. But the passions will cool their hot fire, and calm with time; and amid the symphonies of the coming harps of my country, knowledge will reveal her beautiful and attractive forms, and become an honored guest in the temple of our freedom.

Our contemplations being purely medical, all this rich and unfrequented field is forbidden us, except so far as it presents a bearing on public hygiene and nosogeny.

As do all the Atlantic States, Georgia presents two very distinct and separate faces of country and characters of soil. For an average of about one hundred miles, the face next the Atlantic is extremely level, variegated occasionally by paludal waters, and wet, oozy ravines. The soil is light and sandy. From this sandy soil, where the other face commences, the surface rises; breaks into hills and valleys,

the hills rising higher and higher till they reach the mountains. The soil is firm, carbonaceous and fertile.

Those, however, who hereafter study nature in Georgia, must, will, make of the whole state three principal divisions. The first lying along the Atlantic of one hundred miles in the transverse section, will be considered pure or homogeneous as to the forming elements; the second lying immediately west, and running in a parallel line with the first of about forty or fifty miles in the transverse section, impure or heterogeneous; and the third extending from this second line to the mountain boundary, like the first, pure and unmixed, but wholly different in the structure and materials.

The physical geography of the second division participates in the characters of the two sections on either side, both as to the phytography and geological elements, which we are soon to consider.

The first division into two great faces or surfaces, we made, will be sufficient for our purpose; the triple section will serve to facilitate the expression of accurate description.

The phytology of the two great faces differs in the extreme. The growth of the first is almost exclusively the pine, and some few grasses; of the second, an endless variety of flowers, shrubs, grasses, brushwood and forest trees.

What may be termed the middle regions of Georgia, to which our observations are limited, includes the whole of the second section, and a part of the third, the western limits of this second section extending along a line south of the city of Milledgeville, and reaching close up to it.

Hydraulic arrangement of the country. The great rivers, which intersect the state, all run in the same direction, at a distance of about thirty miles from one another. These rivers flow to the southeast and cut the isothermal lines at an angle of about 35° . The middle grounds between are the highest ranges of the country, through which they pass running parallel with their course. On each side of these elevated grounds burst the cool fountains, which form the tributary streamlets; so that the discharging trunks of the streamlets on each side with all their ramuli, would be

represented by two trees fallen with their tops in juxtaposition. Betwen the ramuli extend the fertile lands, formed as it would appear, to stimulate human industry, and for social happiness and domestic bliss.

Thus the mode of hydraulics nature has adopted here, beautiful and admirable as the country for which it was formed, favors the exhalation of the waters for the formation of clouds and dews; and the passage of the residue into the sea.

This description, however, applies only to the second and third sections, whose inclination to the sea appears to be much greater in proportion, than that of the sandy or first division. I know not that the relative elevations above the level of the sea have been ascertained by our civil engineers, but it is certain, the country from the sandy boundary rises much more rapidly than that from the sea to this boundary, manifested by the greater velocity of the river waters. The face of these two sections accordingly is much more favorable to the hydrauamic movement, which everywhere active urges away the rain-water, and allows it to accumulate nowhere into ponds or lakes on the surface; while on the sandy face, from the tardiness or inefficiency of this movement, the water from the clouds accumulates, as intimated, into ponds, or by boiling fountains, lakes are formed, which have no discharging conduits to conduct their floods into the sea.

Phytography. The vegetable products of the different faces of the country vary, as I have already said, on the widest scale. The sandy face formed by vast plains, covered with monotonous pines, and intersected by wet boggy ravines, is sterile, and repays but very sparingly for the labor of cultivation. The paludal and fluviatic growth only exhibit any thing like variety. From the great sterility it must ever continue chiefly a wilderness, and the sparse population it feeds, principally by gregiculture and the chase, with some exceptions, remain forever in letters, religion, civilization, far inferior to the same people, who occupy the other two faces of the country.

The site Milledgeville occupies in the second division, on the western range of hills, which border on the low grounds of the Oconee river, in the original state, was covered by luxuriant grass, and the dark shade of the forest. Here, in antiquity, many of the magnolias opened their voluminous, fragrant flowers; the oak and the poplar, always rivals, waved their branches together, and displayed the grandeur of their forms. By the side of the oaks rose up many of the proud coniferæ; at their feet the *Cornus Florida* opened its cold white flowers; the monocotyledons found room for many of their numerous race, and the great dicotyledonous family in crowds unfolded their verdure.

The soil on which the city rests, firm and carbonaceous, extends, without much variation, except in the mineralogy, to the mountain boundary; and the sylvæ or phytography is nearly the same.

According to the divisions now made, about one-third of the whole state is a sand more or less sterile, which lying low and level slopes gradually to the sea-shore; the other two-thirds rich and fruitful, rise with greater proportional elevation to the western limits. With the varying face of the country, with the varying richness, the living productions vary—the vegetable tribes, and the civilized population. Plants, animals, man, everywhere bear the impress of the nourishing soil. The marks, modifications, the soil effects, are chiefly visible in the organic contours of plants and animals; but man wears them written on his moral constitution, on his soul, as well as on his body. The people of no country are exempt from them. And if, as we know, the Bedouins of Arab descent differ from Arabs, the people on the lands which slope to the Caspian and other seas differ from the same people living nearer the cacuminal ranges of countries, so the sparse inhabitants of the sandy plains—what bears the living form—differ from those who occupy the two upper sections, or the Arcadian portions of our country.

In many localities, a great number of the *phytographica* are crowded into narrow space; and in many, the framework or skeleton of the country is left bare. Nature, I may

say, has tempted man here to study her labors. A dark night still lives upon them. One day, the geognost and the faunist will come with the lighted torch. *O nubes fugientes! O clare dies, et optande!*—and the august voice of science will be heard, commanding them to assume the order of human reason.

ARTICLE II.

Geology.

The scenes presented beneath the flat surface, and loose sandy soil; and beneath that of the second range of the triple section made, warrant for these two divisions the denomination of *Atlantica*. The vast amount of calcareous matters at every approachable depth beneath the surface, found in the organic state, and in almost every variety of chemical modification, marks here, at some epoch, the great abundance and activity of marine life; while the strata, which cover this once living scene, and entomb these ruins, everywhere manifest the action of water—all bearing testimony, that this part of the country has been born of the sea.

But here it is not ours to consider the active forces which lead in geological changes—forces which on land upheave some parts of the surface, and depress others—which for ever impels the sea-water in deep channels along the floor of the oceans—which of the zootic ruins alone form so largely the solid bases of all countries, as well as the soils that cover them—nor contemplate those great floods which broke over the isthmus, which must anciently have united Africa to America, swept away the entire surface, except what now forms the West India Islands; excavated the basin of the Caribbean Sea; and deposited the *detrita* on our former coast, driving the waves one hundred and fifty miles farther back from where they broke. These detrita, deposited in the shallows of our sea, raised up the bottom above the watery surface; and filling up all the bays, creeks, tongues of water, which extended out, and occupied the second section of our division, formed of the whole dry land; and drove

the sea back to its actual boundaries. This whole region constituting our Atlantica, everywhere presents monuments of which in a moment I shall speak, of this manner of formation.

The soil here is a silicious sand impregnated with carbon of vegeto-animal origin, and, in some places, is covered over with a thin layer of carboniferous earth. The chief and perhaps only basis on which it rests, is strata of the carbonates, and hydrocarbonates of lime, often infiltrated, and colored by the oxides of iron forming ochres. Masses of sandstone and lithodamous rocks are occasionally observed on the surface.

On the extreme limits of the county, in which I reside, there is a locality, where these sandstones present in the distance a most magnificent, and imposing spectacle—that of a great city in ruins. The place is an elevated, sandy plain, the ground behind the rocks breaking precipitately into a deep ravine, and leaving the horizon blue and open. It is remote from any settlement, and lonely. No noise is heard, except the low moaning of the pine tops, which continues to fill the hollow void above you, even when no breath of air is stirring, awakening superstitious dread. The plain being elevated, these rocks beautifully white, are visible at a considerable distance. On the approach, you behold them above the dwarf pines extending in a pretty regular line to the horizon on each side. In some places, their angular forms present to the eye the appearance of superb edifices of pretty regular architecture; in others, from their rounded tops, that of great domes; in some, that of a vast colonnade, the tops of the columns here and there broken off. The summits of many of these rocks having been dislodged, and thrown down by earthquakes, present the appearance of ruins. Thus, nature subjects the works reared up by her own art to the same decay as those of man's.

The soil on which this mock city stands, like that of most of the surrounding country, and a large portion of this entire region, is a deep sand, which rests below on the limestones I have already described. In many circumscribed

localities, in place of this sand, a dense stratum of red clay covered by a fruitful soil, lies upon these stones. In some places it has been found to be from fifty to sixty feet in thickness. It contains none of the remains of life; and evidently has been brought down from the elevated parts of the country, and deposited where it occupies, by the action of river waters. Wherever this red stratum exists, these remains are always discovered below the depth it reaches. Thus, in digging for water, fourteen miles southeast of Milledgeville, sixty feet from the surface, and below this stratum, was drawn up a quantity of shells of the univalve and bivalve mollusca, which formed a bed there. They were solid; looked fresh and beautiful, many of them still retaining their deep carnation color. Their place was the place of the limestones, which occupied the bottom of the sea, that preceded the land-formation.

Where this red, clayey stratum does not exist, the zootic ruins are met with at every depth from the surface. On sinking a well in Twigs county, at the distance of thirty feet, the shaft passed through a dense layer of beautiful anthracite—future store-house of domestic fuel. Near Mr. Johnson's mills in the same county, at the bottom of a ravine covered in shallow fountain water, a coral reef of some extent is visible in the dry season, and in a state of perfect preservation. These zoophytic limestones are found in different localities. Four miles above Sandersville, is a bed of oolite, containing innumerable remains of the *Terebratula spinosa*, *Pholadomyia fidicula*, and species resembling the *Gryphæa incurvata*, and other spiral mollusca, found in the lias formation of France, England and Germany.

The limestones immediately under the red clayey stratum where it occurs, and elsewhere, under the most superficial layer of the whole of the Atlantica, contain in abundance the imprints or remains of species of genera living and extinct—of ammonites, oysters, crabs, lobsters—shells turbinated, umbrellated, multilocular—every variety, we may suppose, now existing in the nearest seas. These fossiliferous limestones, as already, may be regarded as forming of themselves

the subterraneous floor of this entire region ; and, in the order which preceded, as occupying, in the soft or unformed state, the floor of the ancient sea, with which the relics of whose life became incorporated.

The geology of the country from the line, where the hills rise, and the surface undulates to the mountains, is altogether different from that of the Atlantica. Here, as I have noticed, the soil is firm and solid ; the clay on which it rests deeply stained with the metallic oxides. Scattered over the surface, or collected in beds, here are found the ores of the metals. Here the metallic, metalliferous veins run in the depths of the earth. The ranges of granite extend ; stoop as they approach the streamlets, and great rivers to let the water thunder over their tops, generating mechanical powers ; mount again on the opposite banks ; go on, and are lost in unascertained limits.

As well as in other localities, fine specimens of this granite are to be seen at the plantation formerly of W. Searcy, Esq., near the state capital. The forming feldspar being pure white, the color consequently is a handsome gray.

Occasionally are interspersed beds of schist of different geological characters. A solid bed of this substance in the bottom of the Oconee river, with the lamellar edges nearly vertical to the zenith, cost the state considerable sums of money in attempting its removal to land the trade on the banks opposite the capital. But, for the want of professional skill and knowledge in the civil engineer employed, the enterprise completely failed. Thus rocks teach legislators wisdom ; and figure in the history of national enterprises.

I will add—the anticlinal dip of the transition rocks sinks below, and cuts the plain of the western horizon at an angle of about 38° . I know not at what point the clinical dip commences.

The whole aspect of this region evinces, that the surface has remained long stationary, where it lies. The huge fragments broken off, the deep fissures in the oldest rocks, enormous boulder-stones scattered about in places, not *idiolithigenous*, all show, at some time, it has been subject to violent,

internal movements, convulsions. All the principal rivers, too, bear the same testimony to this great antiquity. I will mention only the Oconee, as it passes the capital. In the hills more than a mile opposite Col. Williams's mills, occasionally hang fractured masses of breccia, which have evidently been broken off by the action of the river current. In the sides of the same hills are great quantities of small bowlders, or water-rolled pebbles. These pebbles lie scattered over all the intervening ground to the present banks of the river; and are the same as those now in its channel. The river-marks, in many places, on the sides of these hills, are elevated far above the highest modern floods. In different epochs, every thing shows throughout the whole area, that the river has had different channels, which it has successively made and abandoned; and that the one it now occupies, is of great age. Like the Po, the Rhone,—by the action of its waters in relabent time, it has elevated its immediate banks considerably above the back ground, adjacent to the first range of hills.

Were the alluvia of this and other rivers laid open, no doubt but the fossilized relics of huge Saurians, ophidious reptiles, and other living forms, would be discovered. The comparison of the places where they would be found with other places, the ascertainment of their difference or agreement with existing species, with similar observations made elsewhere, would form the rude alphabetical elements, by which the age of this elevated, fertile region of the country, might be submitted to speculative calculation. But the same night which obscures the age of which I speak, obscures likewise all the paleontologic data; which by accident will come to the light; and be brought forward by musing curiosity, to embellish our country's future philosophy. But, seduced as I have been by the interest of the subject, I have already trespassed sufficiently upon discussion purely topographical.

SECTION III.

MODIFYING INFLUENCE OF THE THREE DIVISIONS OF THE STATE ON
DISEASE—OR GEOGRAPHICAL NOSOGENY.

FROM the sea-shore to the most elevated and extreme portions of the state, the hygrometrical atmosphere varies; and affects more or less the habitual health. The people on the level sandy division are stimulated less, live, as I may say, less by their atmosphere. The amount of waters stationary on their soil, keeps it in a state of unhealthy meteoration from which it is never free. If its habitual moisture relaxes, the malaria it constantly holds, weakens the general action of the living forces, which causes their common health to differ so visibly from that of the people of the higher and drier districts. The water they use, more impregnated with unwholesome mineral substances, is, too, less stimulating. Their locality consequently predisposes them more to cutaneous diseases, chronic inflammations, ulcerations, glandular enlargements, hypertrophies, neuralgic affections, hydropic effusions, œdematous swellings, passive hemorrhagic irritations—and to a life less active, which all observation confirms.

The people of the second division of the state, which participates in the qualities and properties of the country on either side, and those above on the face, I have described as older in formation, breathe an atmosphere two-thirds of the year free from miasmata—an atmosphere drier, and consequently barometrically heavier, and more roborant.

This atmosphere stimulates their blood, rich in its color; and all the vital functions play in the fulness of their activity. From this plethora of life, excellency of health, they are more liable to all diseases of the sthenic form, or to all acute and violent inflammations; especially to those of the internal dermic tissues, or of the mucous and serous membranes; and are freer from all the morbid affections, which have for their predisposing cause, the languor of the living movement. Their greater liability to serous and mucous inflammations, is occasioned by the more rapid and sudden transitions of the

temperature of the weather—depends upon what belongs to climate.

In proportion as their vital activity is more exalted, their living forces respond more promptly and energetically to all stimulations offered—to the action of the external supporters. They carry about them all the power which causes the acuteness of pain to be felt—all the fuel in their combustible health, which fever burns. It is among them, when they come, that acute fevers kill, that epidemics suddenly slaughter. Like the Franklin, which silently, and gradually steals away the lightning from the clouds, and silences the paroxysmal thunder, the inhabitants of the low sandy division of the state, by becoming habituated to the action of the miasma, which continues always in their atmosphere, gradually steal away its power, and prevent, to some extent, in returning seasons, its explosion into acute fevers. But these people of the granite and mixed regions are swept away by the periodical miasmatic meteoration of their atmosphere, when it comes in its power.

The second division of the state or mixed region, may be considered as nearly equal in health to the section above. But its sources of malaria are much more abundant, and more active, and when the sickly season arrives, it is here the fevers display their greatest strength, and humble most the power of medicine. This season occurs toward the approach of autumn, when nature's chemifactions of the summer foliage, and insect lives, that crawled, and swarmed, poison the air, which through all the preceding seasons had continued pure and healthy.

In the low country, the principal vegetation being evergreens, the summer comes there with but few honors. It is, consequently, the paludal or stagnant waters on the surface there, which feeds the atmosphere with malaria, and supports it always in the unhealthy state; while it is the chemical decomposition of the great summer growth,* of

* The silting up or shallowing of the channels of running streams by the clearing of the lands, allows some water to stand occasionally on the low grounds, through which they flow, which forms some little exception to this general description, as applicable to the actual state of the country.

the two higher sections of the state, which meteorizes it, and gives to disease dependent upon it, a paroxysmal or periodical movement. The great difference, therefore, in this respect is—in the one section, death continues always at work, but works slowly; while in the other two sections, he labors chiefly at certain seasons, but labors in a hurry, and with prodigious effect.

The climate of the middle and upper regions of Georgia, however, for the last fourteen years, has, most evidently, been undergoing a change decidedly in favor of general health; and the periodic seasons of sickness and calamity come more seldom, and with much less violence and fatality. The causes of this change will be noticed in the succeeding sections of this work.

SECTION IV.

MEDICAL GEOGRAPHY OF THE MIDDLE REGIONS AT THE PERIOD OF 1818.

WERE it ours to address invisible powers for sublime inspiration, and the sweetness of flowing numbers, to portray the loveliness, grandeur and beauty of nature—of a country untouched by the ploughshare or keen edge of steel; every hill a magnificent little territory in itself, every valley an empire of flowers, every stream a wild harp to scatter the minstrelsy of dashing waters and speckled birds on the passing winds; every blade of grass, herb, flower, every shrub, tree; all living, breathing things in their original place progressing in the eternal order in which they started at creation—we were sufficiently tempted. But it is ours to contemplate this order violated, scattered, ruined—this country, personification of a youthful virgin, decorated with flowers; the waving trees, her nodding plumes, the limpid waters, the tears of her untold love, stript of the vestal dress, the bridal honors; and all her tender sighs, remembrances, loves trampled in the dust, and forgot.

How visible the effects of the revolutionary action of a civilized people upon a new country! how conspicuous the

imprints of the seal of industry, arts, knowledge! All philosophers, historians, have noticed the great and decided changes, a country undergoes, in passing from the wild, natural state to the possession and action of civilized man. I need not advert here to what Strabo, Diodorus, Cæsar, Pliny, Tacitus, have said about the alterations which took place on cutting down the forests of ancient Gaul, Britain, Germany, and other parts of Europe. The alterations more or less are the same everywhere; and we have them here before our eyes.

These alterations occur not only in the soil, general face of the country, but likewise, in the atmosphere or climate.

SOIL.—By clearing off the growth, and exposing the soil to the direct rays of the sun, some modifications immediately take place. These are purely chemical; and due to the agency of light. As a sort of mesh-work, the roots, which had held the soil together, decay, and allow the rain water to furrow it into channels more or less deep, washing the detritus into the lowest places, and tending to the levelling of the common surface. By this method of removal, and constant tillage, necessitated especially for the growth of the cotton staple, the fruit-bearing soil, in a few years, is wasted and exhausted.

In deep strata, part of the soil is left on the lowest grounds; part is silted or covered up inaccessible to the roots of plants; and a portion, deposited on the low grounds of rivers and rivulets, shallowing the channels of the latter. This process of shallowing is much accelerated by the great amount of fallen timber which sinks into their bottoms, or rafting up, prevents the free passage of the waters. A heavy rain or succession of a few rains now, cause them to overflow their banks; and leave a quantity of mud and muddy water on the low lands.

Climate.—The climate suffers change from the reciprocal action which exists between vegetation and the atmosphere.

The trees, by their deep roots, absorb the rain water; shade the ground by their foliage; thus retard its evaporation from the surface; and, by the friction they oppose to the motion

of winds, prevent, to some extent, the evaporated portions from being carried away. Through the action of the sun's rays during the day, with the oxygen gas, the green leaves exhale an abundant moisture, which, with what goes up from the earth, descends in heavy dews the succeeding night. Thus, a shower falling on a district of country, covered with a heavy and dense forest, is repeated in the dewy showers each successive night, until growing less and less, it fades and disappears. In this way, through nature's kind provisions, plants are allowed to detain, and enjoy long the moisture brought by the clouds, pabulum so essential to their well-being.

But on this same district of country, all its branching trees and shade destroyed, and the naked soil exposed to the burning rays of the sun, this shower falling would quickly evaporate and be lost. Each passing wind would scatter, bear to some other region part of the moisture; and soon there would be but little dew at night, showing that all had disappeared. The chief storehouses now of future rains, would be some distant countries near the great waters, and the approach of the clouds depend more on the course of the winds—*pluvialibus Austris—unde serenae ventus agat nubes—*

Sæpe etiam immensum cælo venit agmen aquarum,
Et sædam glomerant tempestatem imbris atris
Collectæ ex alto nubes : ruit arduus æther,
Et pluviâ ingenti sata læta, boumque labores
Diluit.*

This tendency of vegetation, therefore, to detain the moisture of falling showers, and contribute to the formation of dews, contributes likewise to that of clouds, and the frequency of rain.

The action, then, of the *sylva* of any country upon its atmosphere or climate, is to maintain a greater degree of habitual moisture; and the felling or cutting it down, must, consequently, lower the hygrometrical rates or produce dryness. And, since the evaporation of moisture or water, according to Dr. Black, and all chemists since, is a great consumer of heat,

* Georgica 1.—322 Virgilii Mar.

not only by the evaporating act, but also by the copious absorption or conversion of it into the latent state without raising the temperature, the sylva of any country, through the excess of moisture it maintains, must likewise constitute the climate colder. The general or great action of vegetation, accordingly, upon climate, is to make it more moist; and, through the laws of evaporation, colder. And, by destroying, or clearing it off, the climate becomes drier and warmer.

These great operations of nature, turned from their ancient course through the agency of man upon her, were observed by Pomponius Mela, Virgil, Cæsar, Pliny, and others. They have left their testimony, that as the old states of Europe were cleared, and subjected to agriculture, the winters became much shorter, and less severe.* In the time of Ovid, the Euxine sea sometimes remained frozen two whole years without thawing, which it does not now do. Pliny assures us the olive and myrtle would not grow in Tuscany *sub cælo aperto*. We know, in the actual time, abundant crops of these vegetables flourish in that country. By a parity of reasoning, we may think our cotton will one day grow in colder climates, and flourish beyond the limits, where it has ever been planted; and that our isothermal lines bearing now about 10° north,† are tending south, and will ultimately librate near the same latitudes, in which they traverse the eastern hemisphere.

Observation and experience show, since the woodlands of Georgia have been so much cut down, and cleared up, long and oppressive droughts have become more frequent, the seasons more irregular; and, upon the whole, the climate hotter and drier. Every thing evinces, our rains now depend more than formerly upon the fickle course of the winds. Hence their greater irregularity. Those beautiful little clouds, born of the breath of flowers, and the wide-spread

* The object of an article in the Edinburgh Review of some years since, was to establish, that the climate of Great Britain is still growing milder; and that vegetables beyond the lines north flourish well, where formerly they would not grow.

† Estimate of Humboldt.

foliage of the country, and tempered with honey,* more seldom now darken our summer horizon, and revive the drooping earth. The rains continue to fall in torrents, long as the winds continue to blow from the pluvial region, and changing, the ground with all the industry bestowed upon it, continues to burn as the fiery globe of the sun passes over it, in some seasons, threatening to bring with it the gaunt image of famine.

Only fifteen years ago, this part of the country in which I write was a continued forest where the rights of nature had remained unviolated. After vernal showers then, the dews at night were so heavy as to leave traces in the roads and other solid places, where they had flowed. But no such phenomenon is now to be observed. The action of the industry of man, therefore, in changing the climate, commences when the first tree is felled.

To what extent this change may be carried by such action or agency in diminishing the intense cold of winter, shortening its season; the drying of the climate; elevating the mean annual temperature; widening the indigenous regions of plants, &c., I think, is not fully known. The speculations of philosophers on this interesting topic are very much at variance. Accurate observations extending through a long period of time; the statistics of countries proper to be experimented upon, made out, and carefully preserved; these statistics occasionally compared together, to ascertain the progress of actual changes, would form data, upon which truth might be speculatively approached. This subject thus investigated, might yield fresh treasures, and precise many truths of natural science; might animate, and offer modifications to industry and commerce; and give new directions to the enterprizes and policy of nations. But this section has already soared with us beyond our limits.

Nearly one-half of the woodland, in the middle regions of Georgia, in the year 1818, had been cleared, and the soil

* This honey descends with the dew, and is visible on the leaves of the trees, forming a thick, shining covering after the dew has evaporated by the sun. But being more diluted, it is not so visible after the shower.

reduced to active and vigorous cultivation. I have fallen upon this date; because then commenced the scourge of fevers I am soon to describe, which continued through a successive series of years; the most severe and calamitous that ever was experienced before or since in this, or I believe, any other part of the state. The country, at this period, therefore, was exposed to all the new causes of disease which originate in the transition from the natural or woodland to the agricultural state; and the climate had passed through the consequent revolutions. From the length of time, the soil had been settled, we may suppose, these causes now fully developed, were operating in their greatest intensity, and widest sphere of activity. So that if Baglivi, *Praxis Medica*, had room to say—"Scribo hæc in ære Romano," I may say in strictest truth—*Hanc morborum catenam, quos, sævissimam, scripturus sum, nitida terrâ Georgianâ, ortam esse. Solo fructifero nati, et solis calore vehemente, hîc cunabula fuerunt; et hîc volabant cœlorum per tractus lucidos.*

SECTION V.

STATE OF SOCIETY.

No stage of civilization presents human nature with so many attractions as that in which intellectual cultivation, truth, virtue and simplicity are the forming elements. It is the stage, in which the heart acts freely, the only office of the tongue, to speak its emotions;—the stage, in which man loves man the most; and in which, the power of her who softens manners operates to the greatest effect.

The novelists of the last age have evinced good taste and judgment, in selecting the fair objects of their stories from this calendar. It is next that below, which brings forth woman with that surprising beauty, and peculiar loveliness, which immortalize her in the pastoral songs of her country; and, in which she comes down time so fresh and fair in the *Bucolics* of antiquity.

In great capitals and large cities, where the sensibility is in constant friction, the passions prematurely develop, weaken the growth of the mind, pervert its faculties; and what the heart feels, the tongue dare not speak. Civilization advancing here, soon retrogrades, and is lost in corruption. The other extreme is untutored, unsoftened rusticity. The point, therefore, at which civilization culminates, or the medium point, is that of perfection.

The fertility of the soil, general beauty of the country—all the physical and moral elements of the people, whose history I here notice, were the most favorably disposed for improvement, of which they did not fail to make the proper use. At the date, on which I have fixed, the soil, not yet exhausted, was in the flower of its strength; and the great staple it so freely produced, commanded at the home markets from twenty-five to thirty cents per pound. It then brought to the possession of its owners the choicest products of foreign art and industry, and attracted upon them the riches, opulence and magnificence of the world.

Each tenant, the owner of the soil, filled the place of Emir of the domain. Independent through industry, and the resources on which they relied, they passed their time in the bosom of their families; and in tranquillity enjoyed the elegances and pleasures of life. Here happiness had a tangible form. The heart, in the medium of civilization, breathed and lived freely in the open atmosphere of nature. It might be said, if in Greece and Italy, immodesty profaned the altars of the Cyprian Beauty, and the vestal fires were put out, kindled here in a country like this, they must burn forever. M. Tourtelle* has said—"the habitual moral sentiments, as they are good or bad, mould the face into beauty or ugliness." It was on the side of beauty here, they exerted their plastic power. Boileau and Racine would have turned from their Tuscan beauties, to contemplate many of the fair specimens which grew up among these peaceful and happy families. Indeed, it is only under similar moral and physi-

* Hygiene.

cal circumstances, that woman comes forth with all her rays, and shines in the sphere of nature.

Prosperous by its trade and enterprise, Milledgeville enjoyed private and public happiness. During each successive season of legislation, it exhibited much gaiety and festal mirth. In the tasty balls, showed the country's fair image, and the public prosperity.

All the passions, moral sentiments of the people, therefore, were favorably disposed to the maintenance of health, and, armed, as I may say, against the attacks and inroads of disease—against those dreadful fevers, I am to notice in the sequel, which, at this time, made their rupture.

CHAPTER II.

MEDICAL HISTORY—PARTICULAR MODES OF PRACTICE— PRACTITIONERS.

VEXATIOUS! a late writer* tracing the history of the medicine of the world, has dispatched that of the United States in a few short paragraphs, mentioned few other names than those of Miller, Rush and Jackson; and regarded all our healing art, as the mere transatlantic echo of the British schools.

Since within about two centuries or a little more, the whole of the inhabited northern, and a large portion of our meridional America, have been rapidly, and successively subjected to the great civilized action of man, producing all those changes of physical geography and climate I have mentioned, and developing almost at once all the factitious causes of disease; it may be safely affirmed, there is no country in the world where observation has been more active and fecund, and where physicians have been better disciplined in the great field of experience and disease.

* Broussais Examen—

Like its maladies, the medicine of America, therefore, is entitled to originality.

Making some allowance for the newness of the country, and deficiency of general learning, this general remark, as to *experience* and *disease*, applies emphatically to the state for which I write.

Medical education.—In the same way, as the physicians of the North once resorted commonly to the older institutions of Europe, our people went for medical education to the schools of public instruction of their own common country. Among these, that of Philadelphia rose first; and has continued ever since to maintain itself the principal medical institution of the Union. It was to this school the most of our scholars resorted. At the time middle Georgia was settling, Dr. Rush was a popular teacher; and his views and opinions (branches of the fruitful stem of Brunonian vitalism) delivered in the warmth of eloquence, became pretty much diffused throughout the medical continent. His instructions, with those of the school of which he was professor, formed largely the basis, on which then rested all the operative medicine of our state, which laid any claims to teaching and learning.

Deficient in languages, faultily more encouraged than condemned by Dr. Rush, and general elementary knowledge at that period, many of the aspirants to the profession were illy prepared for the lectures they sought, and the learned halls of medical science. A large number prosecuting their studies, remained only a solitary season in the lecture room; and returned home to be flung in practice, upon the field of cruel and energetic disease, which I have reserved for the next and succeeding chapters. Short preparatory study begun under every disadvantage; and a short sojourn at the medical institution, left them, on entering their professional career, close to absolute, original ignorance. The great majority, therefore, did not come forth ready moulded by the hands of the Alma Mater, but were shaped to physic on the actual field of practice.

There were, however, a goodly number, armed with the

great force of general science, who exhausted the stores of medical knowledge, which had been drawn from the old stores of Europe; those, which had been added of our own country; and practised by the lights which had been kindled.

These Alumni, returned home, and entered on the arena of disease, soon saw what passed, and was deemed medical truth and experience in the northern United States, and Europe, was often here any thing other than medical truth and experience.

But besides those who had studied medicine in form, as in all countries, there was a host of other curers of disease, who made up the *prodigiosum medicorum corpus*. Some of these administered only to particular diseases, for which they had discovered or obtained the secret of infallible remedies. The malice and ambition of others were directed only against a single *ailment*, for which they were famous. Some, in all cases, relied on deep and cruel mercurial salivations. Among many, even, who claimed to be educated, this mode of practice in fevers, was held in great favor, and lavished on their patients. So greatly was this drug formerly used, repentant mothers, in our day, have surprised their innocent children grown up, weeping in the toilet over the ruined features, which the graces had fashioned, and meant to be handsome.

Others knew the hidden virtues of unknown roots and plants, potent destroyers of many disorders. Lastly came with her fragrant herbs, the knowing midwife. With her warm teas, she stopped the flow of blood from wounds; relieved headaches, lumbagos—with the same remedy warmed the cold of agues; quenched the heat of fevers; provoked the catamenia; or suspended uterine hemorrhage.

But since that day, I may add, the means of obtaining classic knowledge, arts, sciences, have undergone regular organization—have everywhere sprung up with their facilities; and are accessible to all ranks of aspirants. And medicine, always in the rear in all ages and countries, begins

now to elevate herself, and lift up her domes for instruction in our own state.

CHAPTER III.

GENERAL OUTLINE—CHARACTER OF DISEASE.

THE supernatural origin of disease has become superstition. In the actual state of knowledge, all the external causes admitted, are contagion, atmospheric vicissitudes, improper aliment, and poisons or miasmata. The latter, very little or not at all accessible to chemical physics, are known only by their effects on the living constitution.

It is not unreasonable, in progressive time, like the great face of the earth, the great body of the atmosphere may be subject to decays and renovations; and that, besides aqueous and miasmatic meteoration, the changes, which thus occur, may operate on life so closely connected with and dependent upon it. For, it will be seen just below, that the same miasma is not equally active in all times in producing the sequences which manifest its presence; from which may be inferred the concurrence of other causes co-operating with it, to which are due its paroxysmal activity and mortality. These causes, I think, observation has confirmed, act independently of the hygrometrical states; and must attach to such changes as I have suggested.

The chemical return of organic bodies to the mineral state, is the conspicuous, acknowledged cause of miasma. In the felling of the timbers, alterations of soil and climate, presented under medical geography, and the subsequent sections of the first chapter, I have described all the sources, so far as we are concerned here.

In a few years, however, these felled timbers disappear; and the poisoned atmosphere regains its purity, in the changes it has undergone. Nor are the miasms, as experi-

ence shows, thus produced, the adjuvant causes inactive while they last, always productive of much disease and ill health. It is only in their complicated action, as I have noticed, that they waste life so rapidly. At one period or other, in the change from the woodland to the agricultural state, in this great complicated movement, they are sure to pass over the country, and display themselves in the giant form of disease. It was evidently in this manner they were progressing over the middle regions of our state, in the development of their greatest power, in 1818, and the eight succeeding years; the time, at which, will date below our description of particular diseases.

According to the observations of Dr. D. B. Searcy, in Mississippi, four hundred miles southwest of us, year 1831, a miasmatic form of disease was raging, very similar in character and violence to that which commenced in our state in the year 1818. The difference in the time of attack corresponds very well with the difference in the dates of the settlement of the two parts of the common country. But this coincidence may be regarded as accidental, since miasma always appears to wait for opportunity, or the adjuvant action of other causes, before it slaughters in the epidemic form of disease.

After the destruction of the timber, or the clearing of the country begins, from the above circumstance, it is not possible to fix upon the time, when the fevers, which depend upon miasma thus produced, shall be developed, and come forth in their greatest strength. We may think, however, the rapidity with which the clearing goes on, or the amount of surface exposed in a given time, may have some influence. But there are so many circumstances, which counteract, modify, foment the causes of such diseases, mentioned by Morton, Sydenham, Pringle, Jackson, Cleghorn, a host of writers, that scarcely any thing appertaining to them can be subjected to rigid calculation. The dynamical properties or laws of malaria, and its modifiers, fecund sources of speculation to physicians, are unknown.

Notwithstanding, I think, after the climate has undergone

all the changes from clearing, and cultivation of the soil, we can plainly distinguish the line, which divides between the diseases dependent upon these changes, and those of a different or epidemic origin, from which no country ever becomes entirely liberated. Thus, after the period of 1826, Milledgeville and the ambient country began to enjoy tranquillity. This tranquillity lasted without much interruption, through the eleven succeeding years; when some intermittents vexed from causes, as I have said, which ever remain to urge untimely death.

The changes in the climate, ut supra, must commence with the settlement of the country. From all I have been able to observe, the *miasmatidæ*, which are the consequences, begin mild at first, and operate only sporadically: and it is not until some years are passed, and considerable clearings have been made, they make their appearance. In proportion as the soil is subjected to cultivation, and the atmospheric changes advance, allowing for the irregularities I have mentioned, they become more frequent and display occasionally more force.

In this manner, the diseases, which occurred in regular form, from the settlement of Milledgeville, and the situate region in the year 1805, until 1818, according to statement of the practitioners, varied at different times in quality and intensity, so as to demand a change or modification of treatment, as will be seen below. Occurring in a country, in the main naturally healthy, they were not frequent visitors for the first few years; and when they came, were easily subdued. From 1810 to 1818, they became more complicated; put on many new symptoms, and upon the whole, their general strength was increased. Between these years, in the city especially, they caused a great consumption of infantile life. But it was not until about the year 1818, the time when our observations commenced, that the adjuvant modifiers of miasma put forth their action, produced that state of the atmosphere called by Sydenham, "unhealthy constitution," and gave to these fevers their greatest flight. From this last date, they increased regularly in power;

assumed new forms of greater malignity; and reached the culminating point in 1821-2.

In the towns and in the country, they raged with great and frightful mortality; and those who escaped from their attacks, did not remain free from the influences of the causes which produced them. After 1822, they began to diminish gradually in violence, and their assaults were not so universal. Their force exhausted with great regularity; and, in 1826, they quieted, as already noticed, appearing afterwards only sporadically and rarely.

If previously to 1818, they occasionally appeared in new and more malignant types, in the succeeding years, they would again become milder. So that their regular strength was only increased in the average of time, and not continuously, as it was after this date, until 1821-2.

The vegetation, which had been destroyed in former years, at these last dates, was pretty completely reduced to the mineral state; and the new clearings then making were nothing compared to those of these years. Consequently, the sources of actual malaria were much fewer, and greatly exhausted, at the time, when these fevers rose to their acme. At the moment when the climate had passed through all the great changes from culture—at the moment their causes were ceasing, and they were about being extinguished forever, like Sampson of sacred history, they were the most revengeful and homicidal. How can such phenomena be accounted for, without admitting the simultaneous action of some great and general change in the atmosphere fecundating miasma?

But my sole object being here to produce a faithful picture, present a record of facts, occurrences, steering far as possible from all speculation, I can only give the subject such notice as is demanded for faithfulness.

The meteoration of miasma is an invisible phenomenon. But there are some perceptible phenomena connected with the history of the atmosphere, which show, that its different parts exist in the closest union, and in a state, the most favourable for the intercommunication of activity, and, that

a movement begun in any part, can quickly expand to parts very remote, bringing about a general and special condition. The igneous meteoration of 1831, which I have mentioned in the *Philosophy of Animated Existence*, and which, from all we know, was more or less visible at the same moment over the western hemisphere, and the great epidemics, which occasionally rage over such vast geographical spaces, are phenomena of this sort.

When *Ætna* thunders, *Vesuvius* is silent. But not so with the hot caverns, in which death prepares his mixtures. They all make their uproar at the same time. Accordingly when our miasmata, 1818, began to be animated with unwonted mortific violence, the yellow fever had already commenced to elevate itself, and strike heavy blows on New Orleans, Mobile; on all our maritime cities; and, as the medical journals of that day show, on the West India islands. The quarantine laws, pretty generally throughout the world of civilized commerce, were then rigidly enforced. And at the time, 1821-2, our affliction and distress were at the greatest height in middle Georgia, this same fever just before, 1820, was exerting its most destructive force on Charleston, and on Savannah, with all the other towns on our own immediate shores.

Upon this view of the subject, we can but look upon some change in the great aerial sphere, as operating universally upon the miasmata of different places, countries, stimulating them to general exacerbative activity. And, upon a generalization of all the facts, it is philosophical to regard the yellow fever of the sea-shore and great rivers; the icterus, icteric affections, and "cold plague," as it was commonly called among us; and the bilious diarrhoeas and mild intermittents of the up country—all as the varied expression of the same thing, the same disease, modified by the peculiarities of the miasmata of different places or local causes of countries. The concert, general unity of the action, in the highest degree, favor this view.

I will observe here—After all the researches that have been made upon *malaria*, *epidemics* and their *philosophy*, the

amount of practical and useful truth we yet know is extremely limited. The subject challenges the patronage and liberality of nations. In order to precise the measurement of a degree of longitude, the governments of France and England, some years since, sent philosophers, at the same time, to the two polar seas, to observe the celebrated transit of Venus. In imitation, it would be worthy the ambition and philanthropy of nations, in subserving the cause of general humanity, to send out men, everywhere, competent to observe the *transit* of disease when raging over the world.

In this manner a vast amount of accurate observations might be made, and collected together, unachievable by individual enterprize, which would fling new light on these great diseases or epidemics occasionally so destructive to the species, and arm medicine against them, for their prevention or mollification.

But to conclude this chapter.—If the nature and history of disease be not as I say, what are the causes since the year 1826, on which depends the comparative exemption of the country from all those varying forms of fever which I have mentioned? The eye of the stranger now visiting the cemetery of our capital, is not struck with the vast disproportion of the infantile sepulchres. The hearts of mothers, nature's tenderest, noblest works, are not sown thick in this hallowed spot of earth as formerly. Indeed, early after the settlement of Milledgeville, as noticed, death watched constantly round the cradle to plunder. At first, he struck furiously at posterity, but afterwards began to strike at all. Then the mother lay together with her infant in the tomb, the father close by their side; the schoolboy and his little sister; the lover and she he loved, with all her glossy locks. Then, Sabbath days, came moving slowly into the church, the dark trains of the drapery of mourning, the long black veils darkening where they approached. Many heads leant gently forward, showed the features in the touching beauty and whiteness of sorrow. The humility of death contagious, deepened, in adoring assemblies, the natural awe and solemnity of religion. The value of life so greatly diminished,

the tedious cares of the toilet were forgot; the young man entered the door of the church as the grave in years, and she blushing came in as the aged of her sex, not revealing at once all the sweet treasures of her beauty.

But what, I say, has produced this happy revolution, has curbed the furious power of death, and spread abroad the joy and tranquillity of public health since 1826. It can only be, that the state of the atmosphere has been resolved, or the cause, purely atmospheric, which fomented the action of miasma, has disappeared; and that the country, becoming drier, warmer and more naked from culture, has become freer from local febrific causes.—“*La culture*,” says M. Virey, “*apporte beaucoup de changement dans la nature de chaque contrée, en defrichant les forêts, dessechant les marécages ou donnant un cours réglé aux eaux, en remuant les terres, essartant les compagnes remplies d’herbes inutiles.—Les terrains les plus deboisés, les plus nus, deviennent aussi les plus secs et les plus chauds,*” *—and the climate, for the same reasons, more healthy, or healthier, from being nakeder, and drier.

CHAPTER IV.

SICKNESS OF THE YEAR 1818.

WHAT distinguished this year the most, was the long and oppressive drought which prevailed.

SECTION I.

THE SEASONS.

VEGETATION sprung forth early, and the little flowers, before their wonted time, enameled the ground.

Solvitur acris Hyems, grata vice veris et Favoni.

* Dict. des Sciences, tom. v, 358.

When it was dry, the wind blew from the northwest, as it always does in our climate; but turning to the south, our pluvial region, it brought close to the frost of winter the vernal showers.

The effusive South
Warms the wide air, and o'er the void of Heaven
Breathes the big clouds with vernal showers distent.

These showers were very regular through March and April, but never fell, as is common, in torrents sufficiently great to cause the running waters to overflow much their banks. The spring set in warm almost from the first. The early days of March, was heard the first solemn thunder—that clock which strikes in Heaven, and mournfully reminds us of the ceaseless motion of time. Soon the jay, the thrush and the lark were heard to halloo loud from the woods; and the mocking-bird was seen fluttering up above the tree-tops in mid-air suspended, in the joy and ecstasy of his song, so justly, eloquently described by our ornithologist Wilson.

During the first three months, after the clearing away of the showers, the sky very frequently assumed that deep cerulean aspect so peculiar to our austral climate. While this sky lasts, generally two or three days, the sun glitters in the most insufferable splendor; his rays seem to foam out of his disk with the whiteness of snow. The horizontal air when he is up, shows in dark transparency. The eye appears to penetrate easily infinite space, and catch a glimpse of the mural boundaries, those high blue shores, along which glides the river of time.

While these pure days of light continue, if the tongue be furred, it is apt to clean; the body feels light and airy, every thing manifesting a free expansion of the living movement. The mind ecstasied, is carried away in a sea of quick and rapid thought.

The season progressed beautifully until May, when soon the last shower fell, and the sun rained uninterrupted fire, until late in October. The earth dried to the depth of about fifty feet, and many fountains, and streams failed. All life relaxed and grew heavy under the continued heat. The

birds in the woods and hedges did not sing till late at night. Fahrenheit's thermometer ranged during the summer from 85° to 105°. When August came, the sky appeared turbid and thick, and of a deep bronze color. This appearance continued through the month; and faded away in September, when most of the fountains and streams, which had remained dry during the summer, began to flow again of themselves from the increased weight of the atmosphere. This long drought has only been equaled by that of 1839, which year was extremely healthy.

SECTION II.

BILIOUS FEVER OF JUNE AND JULY.

THIS opusculum has already extended beyond expectation. Our object with these fevers here, will be to seize only on their most prominent phenomena—gather up enough of them to make them known. Nor shall I quadrate them with the fevers of authors. You may examine through the *Nosographie Philosophique* of Pinel, the arrangements of Stoll, Selle—of those most approved; here and there you will find the symptoms, scraps of them, but nowhere the entire form together, as they appeared among us.

The bilious fever became prevalent early in June, generally in the angeiotenic or inflammatory form. All the irritations of the mucous and serous membranes, which had occurred during the spring, were accompanied with copious biliary secretions, manifesting a very excitable state of the liver.

Often now the bile would flow spontaneously and copiously into the *primæ viæ*, and pass off by exciting strongly the defecative movement. In these cases ordinarily, the phenomena of fever would be but very feebly developed; and the sufferers recover health in some days without medicine. But in some instances, the bile would excite both violent catharsis and emesis; and, without interference, the patients would vomit, purge, exhaust and die promptly. In others

again, the liver would secrete sparingly, but in abundance sufficient to exasperate prodigiously the already irritated gastro-intestinal mucous surface. In this pathological state would be declared either the one or the other of two very distinct series of phenomena, called bilious colic and bilious fever.

1. *Colic*.—All the organs subordinated to the trisplanchnic medullary system, in this form of disease, when severe, were thrown into the most violent and persevering excitement, subverting all the natural functions. The alimentary organ contracted on itself; all peristaltic motion was completely suspended. The muscles of the abdomen, drawn firmly and irregularly tight, gave to it the touch of a solid, knotty substance. Respiration, of course, was much impeded. The pain was insupportably great, manifested by the constant and loud cries of the patient; and the countenance was indicative of the most frightful suffering. Soon the pulse grew frequent, small, and feeble; and a copious, cold, viscid perspiration wet the whole body. And, in spite of the energetic interference of all art, in some instances, these abdominal muscles held their firm grasp, till late in approaching death.

Sometimes, the cerebro-spinal nervous system, and the organs in relation, were drawn into complication; and played in this mortific whirlpool of the functions of nutritive life. Then the voluntary muscles spasmed, and the head and knees would be more or less approximated, which no common force could separate. I have often shuddered at the recital of the efforts which had been made by sympathizing, pitying spectators, to straighten their friends thus distorted. The great function of innervation gave way promptly; the nutritive or chemical functions of the organism appeared to suspend from the commencement of the attack; and the capillary blood easily yielded its elements to secretion, as manifested by the serosity of the perspiration. The organic edifice reeled under the first blow of these colics; and tottered to desolation. The loud cry of the sufferer soon grew less and less, as the perspiration became more abundant,

cold and serous; the dulness of slumber was coming apace; and the voice faded away into a low moaning, as the bell, which afterwards announced the preparations for sepulture. From ten to seventy-two hours after the attack, death or recovery was established.

Fever.—Fever, however, was the most common form, in which the miasmatic poison displayed itself on the vital economy. The fever, of which I have spoken above, so closely associated in *cunabulis* with the constipated colic, was emphatically the fever of August and September; and was seldom met with in the early part of the summer. I shall notice it presently.

The bilious fever of this year, I have said, commenced in June. Besides the continued form, the common remittent and intermittent types, were the quotidian and tertian. All the quartans, I believe, which continued during the succeeding winter, were degenerations of these two types, in cases where the fever had been badly cured, or cured without due depletion. The access generally came on with a chill in the forenoon; and the exacerbation exhausted itself the succeeding night. Copious throwings-up of bile announced the transition from the cold to the pyrexial stage. When the type was remittent, only a slight cooling occurred in place of the chill, and the fever passed on in the same revolution.

During this and the largest part of the succeeding month, in the exacerbation, the unity of the functions, or the *consensus universus*, was maintained; the vital forces expanded freely their action; and all the great organs responded liberally to the exaltation of the general movement. This state of the functions, however, would continue but for a few days, or a few revolutions, when these fevers were abandoned to themselves. They would generally soon kill or cure. Curing—they left the liver and spleen hypertrophied, the digestive mucous membrane phlogosed, dragging after them a long train of evils. Or sometimes metamorphosed into the quartan type, they revived, and run a long career. Destroying life—the sovereign function of the brain ex-

hausted, failed first; manifested by indisposition to all motion, perpetual, dreamy sleep, delirium.—In universal prostration, death came speedily. From the attack, the motion of these fevers, therefore, generally, was quick and rapid to the termination; bringing the functions to a partial suspension in the cooling and cold stages, but elevating them to prodigious intensity in the exacerbation. Patients sick but a few days, and recovering, sustained a great loss of the living substance, manifesting the brisk activity of the function of absorption, by which they were attended. Often, those which were intermittent, finished their revolution in a warm and copious perspiration.

In their generalizations too exclusive, Clutterbuck and Broussais each founded fever on the local inflammation of two separate tissues; the one, on that of the brain, the other, of the stomach. In these fevers, both would have found abundant aliment to nutrify their hypotheses; for these two organs were the seats of the greatest disorder and torment.

SECTION III.

FEVER OF AUGUST AND SEPTEMBER.

THE natural tendency of long-continued heats and drought is to weaken the forces of life, diminish the general intensity of their action; and produce leaning by provoking the constant flow of perspiration, especially among the laboring classes. All fountain water becomes more highly impregnated with mineral substances, and more irritating to the *primæ viæ*.

I know not the nature of the meteorism or bronze-covering of the August sky. The red flame of the sun behind it was somewhat quieted, but still burnt. Things below wore a gloomy and lugubrious aspect. The crimsoned disk of the sun was sometimes visible to the naked eye, even near the meridian. Imagination looked upon this sky as the palace of death; and the color, as harmonizing with the blood of mortals, whose immolation had commenced. About the ter-

mination of the meteorism, in the evening, when the moon was absent, the zodiacal light appeared, and shone beautifully. But I do not know that such phenomena are associated in the causation of our good or evil.

From the debilitating effects of heat, and constant action of miasma, it was manifest when August and September came, the synergies of the living system were weakened; or if I may so express it, the functions were held together by a much feebler force. So that the same fevers, the same in their principal elements, which, during June and July, had produced such surexcitation, or expanded so freely the general movement of the organism, increased now in power and malignity, did not generally rally this movement. The organs inharmonious, struck by these fevers, in the worst forms did not any longer resound in their wonted tones, and each articulate justly the blow received. Some expended their strength with fury; some fell into apparent inaction. In the midst of the exacerbation, some parts as the head, a portion of the body, burnt with raging heat; others, as the upper and lower extremities, were frozen as with ice. In the face, a death-like paleness alternated rapidly with a transient blush. The maddened functions, armed for mutual destruction, fought against one another. They were a house divided against itself. The great sovereignties of the nervous and arterial functions, which hold all living forces, actions in their equipoise, fell prostrate. All order, all rule in the economy was violated; and, in universal dysnomy, death obtained an easy victory.

These are the fevers mentioned above, so closely connected *in natu* with spasmodic, bilious colic. Early in the summer, we saw the living organism respond promptly and freely to the stimulus they offered. The secretions generally were easy and abundant. The functions in the intermittent form, played through the different phases of the disease, and returned regularly to the same starting point, with the gradual loss of power at each revolution, the periodic movement being equable in its entire course. But now very few

cases completely intermitted. The traces of periodicity were often only visible; some slight remissions occurring in all.

The chylopoietic secretions were suspended, or took place only sparingly. The tongue wore a dark brown covering, the papillæ much developed. The mouth was dry—unquenchable thirst—continual tormenting sickness of the stomach—pain of the head—sense of breaking the back and leg-bones—constant jactitation on the first days of the attack. The pulse frequent, corded, the pulsations soon ran into one another, became more or less continuous—creeping. The venous blood drawn, was very dark; and so thick, that it required a free orifice to flow. The alvine evacuations often had the appearance of a black *sanies*; and sometimes, that of coarsely-powdered charcoal slightly moistened.

If they did not commence, these fevers, in a great number of cases, soon fell into the adynamic state. Then the patient affrighted by spectral illusions cried out aloud, and started up from his bed. In a moment he slept again, and talked incoherently. Tormented under such complicated ills, he enjoyed but little repose. Quieting, he dosed a few moments in delirium; then waking suddenly, greedily asked for water, and the time of day.

But winter coming with the frost, health returned to all the living, except to those I have mentioned, who had suffered deep lesions of the internal organs, and were oppressed by those outlaws of the medical government, the rebellious quartans.

The fevers of which I have just sketched the outline, combine some of the symptoms of the *febris inflammatoria* of Stoll, *febris continua inflammatoria* of Frank, and *fièvre angéioténique* of Pinel, with those of the *fièvre adynamique ataxique* of MM. Pinel and Roux, the *typhodes*, *asthenic*, *adynamic fever* of numerous authors.

SECTION IV.

SYNOPSIS OF THE TREATMENT.

THE different groups of symptoms—series of morbid phenomena just sketched, may, I think, all be regarded as the varied results of the same external causes operating with modified intensity under changed circumstances, and one in causation.

ARTICLE I.

Bilious vomiting and purging.

Early in the onset of the disease, by its violent and constant contractions, the alimentary organ promptly expelled the ingesta. Then the bile was discharged without mixture. I have often been astonished at the great quantities of this substance which could be secreted, and thrown off in a few short hours. The duodenum generally appeared to form the axis of the double motion, which was often synchronous; and it was very rare that true symptoms of the Iliac Passion occurred. In the worst forms of the disease, when the stomach was not supplied with bile in the intervals, it contracted firmly on its cardiac orifice, and remained almost constantly in the attitude of emesis.

In this hypersthenia of the nutritive organs, the skin and extremities became very cold. Every thing manifested an instantaneous and rapid decay of all living power in the balance of the organism. The treatment commenced at this moment; a large blister was placed over the epigastrium; sinapisms, hot fomentations, whatever could reanimate the circulation, and the warmth, were applied to the surface. Laudanum in drachm doses was administered, and repeated at short intervals until vomiting and defecation were arrested. To produce these results, in not a few cases, an ounce of the strongest laudanum was necessitated in a short period of time; and when given as demanded, never produced stupefaction or sleep. Often it happened, the slightest distension

of the stomach by gum water, any drink, would cause instantaneous vomiting. Then the laudanum was given without dilution, absolute rest for a while was imposed on the stomach, and the sufferer encouraged to bear the torments of thirst. When it could be retained, brandy toddy was freely administered with the narcotic stimulus.

The stomach and bowels thus quieted, the patient took freely rice water, cold mucilage of elm or gum Arabic, acidulated drinks. Stimulating enemata were employed to provoke the natural peristaltic movement; and recovery sometimes took place without any further symptoms. But often it happened on the following day, after calm had been restored, it was manifest the brain and circulatory system had sympathetically become excited by this *entero-gastro-hepatitis*. Then the phenomena of the case were those of a true bilious fever, which generally yielded to the mild antiphlogistic regimen, tonics and anti-periodical remedies.

Though so terrible and mortal in themselves, there were extremely few of these cases, if the laudanum and other stimulants, when practicable, were boldly, and fearlessly used according to the urgency of the symptoms, but what would recover. Convalescence generally, where fever did not follow, was very rapid, and health did not delay.

ARTICLE II.

Spasmodic bilious colic.

This form of disease, as intimated, was a true tetanus of most the whole body, the greater part of the organs being bound as with iron fetters. In the great perversion of the pulmonary, nervous and arterial functions, all remedies in the ordinary doses, had completely lost their power, and become nugatory. In many cases even, those the most energetic, as opium, camphor, given in large and fearful quantities, and oft repeated, were very little or not at all perceptible in their effects. The organism, in most cases, was but very partially under the dominion of therapeutic agents.

The treatment was commenced by a large blister to the

abdomen. Warm, stimulating, antispasmodic lavements were ordered; topical blood-letting, blood from the veins in quantities much as could be procured or the patient could bear. The time, however, for all blood-letting soon passed after the commencement of the attack. And though opium was without efficacy by itself, when combined with tartar emetic, it showed itself a great and powerful remedy. The form of administration was twelve grains of the latter shaken up in an ounce vial of laudanum, and given fearlessly in drachm doses *pro re nata*. Even in extreme cases, where a whole vial would be consumed in a few hours, the medicine seldom or never provoked either sleep or vomiting. When exhibited in quantities to equal the case, a warm perspiration came out, stood in great drops, and suffused the whole body.

In the numerous cases I have witnessed in a long course of practice, often this formula could alone break the strong fetters which bound the organs, and prepare the way for the successful action of other medicines. And from much experience in the actual field of practice, I would recommend it, or its equivalents to my fellow-practitioners as the surest remedy, a remedy most worthy of confidence, not only in the affection I here treat, but in all the forms of tetanus.

The stiffness, rigidity, of the organs reduced, the patient enjoyed some repose with the sense of great soreness and weakness. The reaction generally amounted to fever which yielded to mild alvine depletion, and the dietetic regimen.

I regret my limits do not allow me to spread out this disease more in detail, treated in a thousand works. It displayed some few symptoms not noticed by Pringle, Hilary, Morton, Moseley, Jackson—by any of the practitioners of warm pestilential climates.

In proportion as the sun pours more of its rays, the diseases, the fevers, of my country lift their fiery heads above the clouds, and overlook those of other lands. In the furious wars they wage on life, the heaviest enginery only of the *Materia Medica* can measure force. The hot partizans of the physiological practice may pity, smile at the delusions

of our treatment; but their tortoise-footed medicine would be left out of sight, and the work of death done, before any thing was accomplished. In the storms they blow, the learned sublime therapeutical nothingness of homœopathy, would fly lighter than gossamer before them. And were these partizans placed on our medical arena, and were they but to witness the single operation of "incendiary" drastic cathartics, thrown into the hot focus of the inflamed stomach, bowels and liver of these fevers, they would feel themselves wanting in pity and humanity to withhold their use.

ARTICLE III.

Fever.

During the early part of the season, in the exacerbation, as already, the organism expanded freely and openly its action. While the chill lasted, all the means of heat were applied, that would not act over to the hot stage. During this stage, copious venesections, emetics, purging by calomel with its auxiliaries, were resorted to, and urged to the extent, if possible, of curbing the violence of reaction.

While these fevers bore well the most active depletions during the exacerbation, a cathartic acting briskly over to the apyrexial stage, was apt to prostrate the patient, and endanger his life. It was, therefore, a great object to complete all these debilitating operations of medicine, before the approach of this stage. Whatever was the type of the fever, depletion was always the only means which could be relied on with safety as the first treatment. Early in the disease, after due depletion, the bark of Peru, quinine not being yet used, with cloves, and a little tinc. opii, were lavished much as the stomach would bear during the apyrexia of the intermittents and coolest period of the remittents. In this way often complete victory was obtained. But, if the fever continued in its course, general depletion was pretty early abandoned for the use of antimonial diaphoretics; and the antiperiodical remedies again urged in each successive revo-

lution. By this mode of treatment, there were but very few cases which did not promptly cure or rapidly improve.

It was very observable, if general depletion, even in its mildest forms, was continued or carried too near the time, when the fever would exhaust itself, or too near the crisis, the patient, despite of all aid, prostrated, and died at the end of the course. And, contrarily, if this depletion had not been carried to its due extent, he soon fell into the ataxo-adynamic state; the chances for death then were much increased; and if he recovered, convalescence was hard to be established, slow in the extreme; and it was long before health came.

Despite of all depletion, the constant flow of bile causing vomiting was troublesome to the practitioner as to the patient. By its interference, frequently the bark could not be retained with the aid of the laudanum, and the fever was allowed to pass on to another paroxysm.

Seduced by incorrect views, many physicians have thought to exhaust and dry up the sources of this bile, by the use of calomel, in large doses, from day to day. But experience has fully confirmed, that this drug employed in this manner, soon hypersthenies the liver, and augments its secretion. Its free use in the first paroxysms of these fevers, was beyond all doubt of the greatest value, and the action entirely sanatory, but should never be pushed to the extent of producing hepatic hypersthenia. Calomel given in this way to a healthy subject in our climate, promptly causes gastro-hepatic irritation, or bilious diarrhœa; and if persevered in, soon the bile flows dark and vitiated. This appearance of the bile, occasioned by the use of this medicine in fevers and other diseases, has stimulated many practitioners, unconscious of the real cause, to urge it in larger and more frequent doses, or to set seriously about salivation, with the hope and expectation of correcting this secretion. And, although success never once yet crowned their efforts, the voice of experience has been slow to be heard.

Though the fevers, early in the season, bore the most active and free depletions, the only means which could be relied on with safety for the first treatment, in those of Au-

gust and September, from changes which had occurred, this mode of medication could not by far be so universally employed, or carried to half the extent. Could the patient be treated in the first or second revolution, appropriate depletion was still valuable—every thing to final success—but afterwards, usually, it became more or less dangerous. Small blood-lettings now would often fearfully syncopate the patient; and a few brisk dejections by a cathartic, were very apt to frightfully prostrate him. Yet it was obvious, patients abandoned to themselves or treated without depletion, much sooner sunk down into the *ataxo-dynamic* state—into the stupor, which commonly ended in death. Depletion, therefore, in some form, and to some extent, after the disease had advanced, was indispensable to safe and successful treatment. It prepared the way for the effective action of the antiperiodical and tonic remedies. It very commonly prevented the patient from becoming typhus, and aroused him when he was already so.

Blood-letting in any way was very doubtful, and was dispensed with altogether in many cases, after the fever had made the second complete revolution. The good of cathartics operating mildly, and secured against over action, and prostration, was most obvious and striking. It was customary then to combine opium with them, however mild they might be in themselves, and to have brandy and laudanum ready to stop their operation, gone far enough, before producing collapse, which had terrified so many people, and sudden death—collapse and death, which had caused some physicians to entirely abandon their use. In the chances for over action, this was a good precaution, and with it, their use was perfectly safe. Often I have seen patients, who had accidentally sunk under them, recover suddenly from the fever as by magic; and often, if not recovering, their cases yielded readily to the Peruvian bark, sugared alcoholic drinks, and diet.

These fevers commonly reached the end of their course in from four to eighteen days. The greatest majority terminated on the ninth day. The paroxysms occurring earlier at each

revolution, indicated they were increasing in violence and malignity; and later, *vice versa*. A night of apyrexia, spent in sleepless dreams and restlessness, forewarned the medical attendant of the terribleness of the coming paroxysm. A patient passing completely the hour of his chill of the preceding day, if he did not miss entirely, was pretty certain of recovery. About the termination, the patient suddenly becoming much better, and animated amid the joy and satisfaction of his friends, with a very slow depressed pulse, was sure to expire within thirty hours. This mistaken joy has forced me to retire a moment from it, to hide my tears. The tongue cleaning suddenly, and very red, was the very worst symptom. The fever exhausting itself, or approaching near its termination, the patient was very apt to sink in the midst of the exacerbation or at the end of it. Sinking in the midst, could he be sustained, it was almost certain he would fall finally in the next revolution if it come. But prostrating at the end of the hot stage, he might weather a few more paroxysms; and the chances for recovery were much better.

This hot stage near the crisis, or when the patient was losing strength rapidly, was a noted epoch, in which death, if he came, made his irruption. It was, therefore, always a fearful, eventful hour to the practitioner as to the friends of the sick—an hour, which tried the valor of his heart, his skill and his talents—an hour of suffocating sorrow, of tears and wild lamentation.

A patient thus sinking showed great paleness of the countenance; and soon a liquid perspiration covered his body, often cold and serous. Sinapisms, heat in every practicable manner, were applied externally; hot toddy, strong and in quantities much as he could drink, with the tinc. opii, in large doses, was given him and repeated, *pro re nata*, until death, or the sinking was arrested, and he recovered from it. Then, to prevent the next paroxysm, should it come, the antiperiodical—the stimulating, invigorating treatment—was perseveringly urged upon him.

In some instances, the dynamical force of these fevers was so great, the functions isolated, all out of equilibrium,

that they ran a rapid and steady course to death ; and no medicine, treatment, could control or produce any very perceptible change in them. If, however, they were early and duly depleted, and the antiperiodical and supporting treatment was introduced at the proper time, and kept up, they very generally cured, and the mortality was inconsiderable. But, in consequence of the different views and opposite modes of practice of physicians, they were allowed to consume much life. Bleeding in the cold stage, recommended in Scotland, was tried by some, and caused instant death. The free use of opium to prevent this stage, a favorite prescription among some of the English doctors, was also tried by others, which produced madness, and effects but little better than the bleeding. Some resorted to furious, mercurial salivation, the only remedy before the winding-sheet, in every species of dark, energetic disease. The patients often expired with great tumefaction of the face, and stenchful sphacelation of the fauces. In some instances, the order of the morbid phenomena was changed, and tedious recoveries took place, with great distress of the chylopoietic viscera. But the antiphlogistic regimen prudently conducted, and the treatment afterwards, described above, were alone safe and successful in the cure of these fevers. I have regretted, I had not known then the experience of Dr. Currie, in the effusion of cold water, so comforting, salutary, when admissible, in the burning fevers of our southern climate.

OBSERVATIONS.

What shall we say ! This treatment so successful would now be looked upon as highly incendiary, and condemnable by a great portion of the medical learned. To mention no more—Tommasini looked upon the liver as the true seat of bilious fever ; Broussais, upon the stomach. With the one it is a hepatitis, which lights up this fever ; with the other, a gastritis. Will medical posterity coincide or condemn ? The fever being simply the sympathetic transference of the

inflammation of internal local organs, the only rational treatment is—to avoid introducing upon them all irritating stimulating substances, which would but foment this inflammation, and put in operation only the means, which would comfort and calm them, or cure their inflammation.

Must observation and experience, the only true lights that guide in the science of nature—observation and experience in this burning climate, which so nutrifies this fever—succumb?

Inflammation is only one mode of diseasation of an organ. While inflammation is by far the most common mode, are we prepared to believe, the living organs so complicated in structure and motive powers, are only capable of functional aberration in a single way? Do we really know, that all fever is only inflammation and its sequences? Have we not reasonable doubts? Death can take place without perceptible traces of inflammation. The urine in a fit of *hysteria* can change its color and properties almost instantly—the hair become suddenly white in extreme mental suffering. It cannot be by inflammation. The thousand anomalous, painful sensations we transitorily feel in all sickness, in the glooms of this life—inflammation cannot be their mechanism. The organs must have other modes of disease than inflammation, in which *bilious fever* may participate.

A thousand times, I have seen quinine, which appears to expand its greatest action on the cerebellum and subjacent organs, suddenly cure a violent bilious fever. Can a medicine acting on the brain causing no lesion, cure at once an inflammation of the stomach, which it must do, if inflammation be the cause? If local inflammation of the stomach fires up solely the other organs in bilious fever, an artificial gastritis ought to produce the same fever. An acrid poison is swallowed in sufficient dose—pain and nausea are afterwards felt in the stomach. Soon come on vomiting, and a burning, unquenchable thirst; and subsequently, the pulse beats strongly, a burning fever rages; the sufferer falls into delirium. But this is not a bilious fever; it has only some few of the elements; nor can quinine suddenly

cure it. Besides inflammation, therefore, other diseased modes of organic action figure in the *essence of bilious fever*.

Broussais expanded a beautiful light over the hemisphere of medicine. Let us do him homage for the good he has done. Other lights before him have shone, and live in the howling desolation of medical antiquity. *O mutatum mutandum!* Other lights will yet come, but the facts of diseased nature unveiled by practice, by the effects of medicines, will stand eternal monuments of evidence to the errors, as to the truths, they bring.

CHAPTER V.

PROGRESS OF DISEASE FROM 1818 TO 1826.

AMONG the meteorological notices of these years, preserved, I see put down—"nothing very peculiar marks their seasons; they have progressed pretty uniformly in the ordinary course."

SECTION I.

BILIOUS FEVER OF 1819.

THIS fever, with the other hepatic affections, commenced about the same time, presented nearly the same phenomena, persevered alike in its course, and terminated similarly to that I have just described. The only observable difference was, that it had gained a little in general strength, but probably did not attack a greater number of the population.

SECTION II.

BILIOUS FEVER OF 1820.

DURING this year, the Yellow Fever already noticed, reached its culminating point in Savannah.—It reigned in

its greatest desolation ; struck with terror where it approached ; and threatened the depopulation of the city.

Indeed, about this period, as I have already recorded, there appears to have existed a meteoric or epidemic condition of the atmosphere over a large portion of the world. This condition we may regard as the general cause of disease. The peculiar local causes co-operating with it, may be looked upon as constituting the diseased affection of one place a yellow fever ; of another a bilious fever ; of a third icterus. In other words, *meteoration* was the universal cause, the varieties, in the diseased expression of different localities, were its modifications by the special local causes. This position is fully sustained in the fact, that, in this year, the bilious fever at Milledgeville ran close along by the side of the yellow fever of Savannah, often more or less deeply shaded with it, and, sometimes, though not so often as in the succeeding year, putting on its express symptoms. It was evidently only this yellow fever modified, as I think, many of the respectable physicians of that day still living, will testify their convictions. But elsewhere already I have insisted on this view.

When the medical year had ended, it was easily calculated, it had borne with more heavy and grievous weight, and that mortality from fever was still on the advance. But it was not in this, but in the two succeeding years, this fever among us took its great and memorable flight.

SECTION III.

BILIOUS FEVER OF 1821—2.

THE fevers of these years, the greatest, most mortal the country has ever witnessed, commenced and progressed nearly in the same types as those of the preceding seasons. They began to rage much earlier ; commenced or sooner ran into the complicated malignant forms ; and continued later.

But in their strength and fierceness, there was a great dif-

ference. No sōbner were they touched by medicine, than they evinced their indomitable power.

The yellow fever was still progressing in the maritime cities and towns at home and abroad. But in Savannah, 1821, its violence had much mitigated. So that it was a year after this city had received its greatest scourge, before the fever of Milledgeville and country situate, rose to its acme.

The cases alluded to, putting on the symptoms of the Savannah or yellow fever, occurred mostly toward the middle, and latter part of the season of these years. In these cases very mortal, the patients threw up copiously to the very last the black vomit, or a liquid resembling that in which coffee-grounds had been profusely mixed. The coffee-ground appearance was often that of dark lamellar flocculi, floating thick in the ejected liquid. The skin became of a deep saffron color. The yellowness began at the superior extremities, and progressed downwards by a well-defined transverse line, until it covered a part or the whole of the body. A few hours only were necessary for the complete coloration. You might almost see the yellowness creep along. In the great majority of cases, however, these symptoms were absent. Still the affiliation of the two fevers was sufficient to show, there was something common in their *atiology*—the meteorized state of the climate.

In the same way, I may remark here, some years afterwards, at the time the great cholera was bestriding the world, there was a general tendency to diarrhoea, when it approached nearest us, where it displayed itself in form. This tendency was manifest, modifying more or less all the prevailing diseases. And in some instances, the matters defecated precisely resembled those of the real cholera. Additional evidence of the extensiveness of morbidic meteorations.

Early after the commencement of its attacks in these two years, this fever so fearful, so mortal, aroused public terror, and spread a panic where it approached. Even those who were in the habit of sinewing their minds against all danger, wore in their bosoms annoying apprehensions. It fell on all,

but females, and those of the juvenile age were the most exempt. The most strong and robust of the males, and those exposed constantly in the open air, stood eminently in the way of assault. But above all, the great brandy-drinkers were decidedly the most susceptible; and, according to my own observations, died promptly after taken, without a single exception. Dr. Charles J. Paine, a very respectable practitioner, communicated to me he had observed the same fact—"that death for this jovial band manifested a decided preference." The black population, naturally much less susceptible than the white, of the attacks of the common miasmataidæ of the country, took the disease readily, though not to near the same extent, and many of them perished.

1. *Contagiousness*. By the approach of August, 1821, it had been observed, that many, who had waited round the bed of their sick friends and relations, were attacked, and died a few days afterwards. Soon the conviction and belief that the disease was catching, struck terror very generally through the community; and especially in the country population. So great was the suspicion, and this terror, in some instances on approaching the house in the country, I have seen the chambers of the sick abandoned, and the duties of the dying bed consigned to some octogenarian of the family.

About this time Prof. Hosack of New York, and other physicians, in consequence of yellow fever, had elevated themselves on the subject of contagion. I made every observation I could on our disease. The attacks of those who sickened and died suddenly after their attendance on expiring relatives, appeared rather to be due to the anxieties which tormented, and the sorrows and fatigues that debilitated, than to any thing emanating from the sick. If the disease were really contagious, it was very obscurely so. Suspicious as every thing appeared to be, Dr. T. B. Gorman, of Macon, who laboriously practiced through this fever, never saw a solitary case from unequivocal contagion. Our physicians, generally, I believe, discountenanced the idea of contagiousness.

2. *Character—symptoms*. Though these fevers appeared

pretty much in the types of those of the former years, yet they presented some well-marked peculiarities. There were comparatively very few that were strictly either of the continued or tertian forms. In all their violent attacks, they observed the most exact periodicity; and made the complete revolution each successive day. Generally, they were unequal in intensity on the alternate days, which, in consequence, were styled "the good and the bad days of the patient. Often, however, they increased in violence from the first paroxysm till they were arrested or to death; and often, these days could not be distinguished. Without any exception, they were all ushered in by a chill, commonly in the forenoon. If reaction took place, the exacerbation continued steadily till about the time for the chill the next day, when suddenly the fever stooped, and the chill came on, so that there was no *apyrexia*. The patient, I may say, was tossed almost instantly from the burning sultry clime of the tropics, into the frost of the poles. If the exacerbation suspended earlier than usual for the coming chill, death was at the door; and might always be apprehended.

In some instances, the patients in perfect health falling into the chill at 9 o'clock, expired by 4 of the same day—a space only of seven hours. Those who perished in the first chill, were literally frozen to death, their forces never reacting or offering the least resistance to the first blow, that fell upon them. The night of delirium into which they soon plunged, ended in the night of death. If they lived through the first chill, they were almost certain to reach the third day, when they were in the greatest, most imminent danger of perishing from the Norwegian cold of this atrocious and fearful malady. After this period, most commonly, the traces of the chill were but little observable; death then came without the freezing, in the exhaustion, suppression and dysnomy of the functions, and they went more calmly and gradually down to the final rest. If, therefore, in the attacks of former years, as I have said, they expired in the midst or at the end of the exacerbation, the great hour of the chill was now the great hour of dying. The fever of these years

killed by more or less consuming, exhausting the strength, but these, by crushing it.

The chill was always long and terrible. The reaction from it, or warm stage, was most commonly imperfect, inefficient, hard to be established; and the general exaltation of the functions, in great disproportion to their previous depression. The bodies of the sufferers did not appear to heat regularly, and all over at the same time, or heat physiologically; but, often pretty much after the manner of inorganic substances, when exposed to warmth. The pulse was small, and very frequent with great stasis of the capillary circulation. The skin dry and unusually white, imparted to the touch the sensation of burning. This was especially the case with the head and body. The upper and lower extremities were comparatively cool. In some instances, however, cool spots would remain on the body throughout the exacerbation. Perspiration only came with exhaustion and death. *Subsultus tendinum* actuated the voluntary muscles. The tongue dark in the middle was furred brown on the sides. A black sordes covered the teeth. The secretions were generally suspended. The stomach continued all the time insupportably sick, with considerable tension of the abdomen. The patient was without *decubitus*. If a vein was opened large enough, the blood came thick, and unarterialized. The alvine dejections procured by medicine, were black, and often sufficiently caustic to excoriate the nates on passing.

The psychological functions were more or less abnormal. The *consensus universus* the most often yielded to the first stroke of these fevers. The living enginery, for the most part, was so stunned, choked up, that it could not play up to excitement. The organs endowed with capital functions, appeared to stand in one another's way; and the movements they put forth, manifested they had mutinied, and were at open war among themselves. And, in many instances, it was extremely difficult, nay, impossible, for the veterans of the art—it would have been for any man possessed of all

that is yet known of medicine—to lay down the correct rules of practice; ascertain where to direct the first effort; and commence the interference. Knowledge, struck dumb before the majesty of such disease, could but be still and silent. Prudence directed to look on, and wait for opportunity; sinew the heart against the entreaties of the sufferers; behold the struggle of nature, but not touch.—Prudence, which inspired Sydenham to exclaim, “the best prescriptions he ever made, was to prescribe nothing.” But the ferocity, rapidity of death, allowed but for a moment this contemplative gaze.

In this havoc of living force, the leeches of the “rational practice” of physiologic Europe, would not have had time to bite, nor the gums dissolved, as was the case in the great cholera. Had many of the teachers of our famous schools been present on this field of medical warfare—teachers, who witness the diseases of their own hospitals and cities; look out from their closets, and see the diseases of other countries and climates; fashion them but too closely after the likeness of their own; originate the rules of practice; *even* dare prescribe the medicines; they would have looked upon many of their favorite theories as “broken pitchers,” the smooth orb of their knowledge, as fractured, and their axioms as axiomless.

Nosology may be useful; its mania is hurtful. The naturalist, the crystallograph, may classify the objects of their studies. The latter, in our time, has given origin to many problems, for the solution of which Mohs has invoked the sublimest geometry. In imitation, medical philosophers still will attempt the classification of diseases, as if they had a definite, fixed form, and enjoyed a permanent existence in nature. In their chances for formation, nothing can be more uncertain than the number and quality of the symptoms, which may group to constitute them. They are mostly indigenous: and take into their composition the color of the sky, the face of the country—every thing external to them; and vary in the fluctuations of localities, of the world. Accordingly, the fevers I describe here are not strictly the

causes, the *synochus*, the *putrida*, *ataxica*, of any nosograph. They are the fevers of Georgia, and, emphatically, the fevers of the particular epoch to which they relate; and stand alone by themselves in their own originality.

The truth is, nature originates for the diseases of the world only the general laws; and allows each country and climate to form their own code according to the great model. In each there is always something peculiarly morbidic, symptomatic, therapeutic; so that what may be strictly medically true in one country, is not precisely so in another. All medical truth is an unit, which admits of many modifications. It is not so much in the truth, as it is in making out these modifications, our great teachers err. The same truth of medicine is true and certain, all over the world, provided these modifications enter into its forming elements. And the great perfection to which the theory of medicine has been brought in modern times, under all the circumstances, more justly than any other, challenges admiration and veneration for human genius.

3. *Practice—treatment—history of.*—The experience of former years cast the die, governed in the treatment of these fevers. An historical advertence to the practice of these years, therefore, becomes indispensable to faithful narration. The errors, as the truths, it unfolds, will help to light up the flambeau in the hands of practitioners entering on the same field, and on the field of similar climates. And bright as now shines the light of medicine, these same errors and truths will still continue to dart its rays deeper and deeper into the dark unfathomable bottom of disease. On this account, this narration is placed here, without aught of malice to any of my cotemporaries, who still live.

In the management of the fevers of the year 1818, I have said, the great lesson of experience was—if the antiphlogistic regimen was not promptly and boldly urged in the onset, a large number of them would soon grow typhous or adynamic; and death obtain an easy and speedy victory. But where this regimen had been early urged to appropriate extent, few, very

few of them, became typhous; and the patients generally recovered, and completely. No irritations of the mucous primæ viæ, nor hypersthenias and enlargements of the liver and spleen remained—conditions of future ills, relapses and quartan fevers. But this was not the lesson of all: and among those with whom this mode of treatment was in bad repute, I remember well in these days how common, how extremely popular, was the expression—“*died of mortification of the brain or of the stomach*”—mortification, the supposed inevitableness of which screened from reproach, and did not hinder medical reputation.

Forlorn! In some of the seasons after the settlement of Milledgeville previously to the period of 1818, the diseases had not borne so well heavy and indiscriminate depletions. The old physicians, in the scenes through which they had passed in these seasons, had been terrified, inspired with the greatest horror for this mode of practice; and, in the experience and minds of many, *death and the lancet, death and a solitary alvine evacuation* by medicine had become *synonymous terms*, and grown into *proverbs*. The common people knew these proverbs descended from authority. Their imagination was excited, and armed against the use of all such medicines and measures; so that often, now, deplorable! when these depletions were absolutely the only reliance for safety, and the only hope for recovery, the resort to them had become dangerous. Accordingly, long since, Galen said with truth, “the physician practicing against the powers of imagination, is disarmed of three-fourths of the prowess of his art; and his well-aimed remedies may do harm.”

For these depletions, which had excited such terrible and lasting apprehensions in their minds and which they had abandoned in disgust and overthrow, these physicians supposed they had authority—authority, of which they did not make the most wise and valuable improvement

By the boldness of his practice in the epidemic of 1793, and by his eloquence, Dr. Rush had flung round the lancet the most fascinating charms; banished from it all fear; and quieted the apprehensions of danger. These physicians

returned home from his lecture-room, confident, conscious of healing power, boldly unsheathed this invaluable instrument for the profuse flow of Georgia blood. They forgot it was the fevers of a southern climate, and not those of their master, they were combating. Soon, in its too indiscriminate and rash employment, they saw the same stroke, which opened the tumid vein, opened with it frightfully and unexpectedly the patient's grave. Thrice and again, and thrice more, they saw death follow the flowing blood, before they could suspect error in themselves or their master.

Mean time, Dr. Hamilton in England elevated himself against the "medicine of expectation," and wrote his Treatise on Cathartics. He extolled greatly their value, their therapeutic powers, in a host of diseases. The profession generally became aroused; and, in the American lecture rooms, as in other places, these remedies were more talked of; their employment more warmly recommended; and they fell into greater use. Purgatives and the lancet had the seal of special approbation of the Philadelphia school; and like the two Scipios on the field of Roman warfare, became the twin thunderbolts of war on the martial field of American disease. Dr. Rush tried fully their value; and the harmonious numbers of 10 and 10, jalap and calomel, so popular, so superstitiously revered, will still be remembered.

Free purging as free bleeding, therefore, in our state had the authority and teachings of this famous professor. Previously to the period of 1818, drastic cathartics had been lavished, and their use abused. Like the lancet, their rash, injudicious administration had proved fatal; and among the Rushian practitioners, fallen into disrepute. And during 1818, and the years immediately subsequent, when, as intimated, these remedies were so much needed, so imperiously demanded, remembering the sad loss of valuable lives, the frightful, sudden deaths, they had seen them produce formerly, they could not be persuaded, under any circumstances, to venture a single dose. Nay, in their practice, so far from their administration, they exerted all their skill by opium and other means to stop, prevent, all spontaneous al-

vine evacuations during these fevers; and had they been able, would have stayed these organs in chains of adamant. Hence, as I have intimated, so many of the fevers of this and the following years, through sanguineous engorgement of the brain and principal viscera, and costiveness procured and kept up, soon grew typhous, and the patients perished, or lingered long in distressing, deplorable irritations of the lungs and chylopoietic apparatus. And, it was not until the country had passed through a large portion of the most awful period of marsh-miasmatic fevers it ever saw or will see again, that these physicans, so horror-smitten with the effects of blood-letting and cathartics, began to lose their fears, and prescribe them again.

Never was terror more completely, more permanently fixed. A fact so strange can only be accounted for by another fact. They sunk suddenly down from the Rushian zenith bespangled with lovely stars, and, apparently certain lights, into its nadir. They discarded all theory as vain, useless, nugatory; and determined to hew out, and shape out medicine alone from experience. Along the maze it led, this experience often contradicted itself; and the light it shed, turned into sudden darkness. Its path was crooked to their feet; and conducted to nothing fixed and certain. The truth it revealed soon took on the form of error; and error, in its turn, assumed the shape of pure truth mocking their reason. They shut their eyes on the great lights of experience ages on ages have shed on medicine, and unknown to themselves, practiced by theory secretly formed in their own minds in the absence of these lights—theory, the creature of a moment's observation in the dark. The theory, which vegetates, matures in these great lights, they hated, despised—theory alone which can open the door that looks into the labyrinth of our ills; which can accommodate, direct, the therapeutic agency of medicines in actual disease; and rationally change this agency in the varying phases it assumes. In the stupefaction of their terrors and alarms, they were left behind, while the career of disease went on. And, when some changes occurred, which most

urgently demanded free depletion, become *phlebotophobes*, they were afraid now to draw blood, as they were to purge.

As they did in the fevers of the years already noticed, in those I treat here, these physicians relied almost solely for treatment on the stimulations of opium and the Peruvian bark. The bark, quinine not come into general use, was administered in decoction or substance to the amount the patient could bear. Laudanum was the form of opium in favor. It was given commonly in large doses, at regular intervals, *per diem*, *per noctem*, through the hot, as the freezing stages. Through all the changes of the disease, through weal and through woe, the laudanum was punctiliously and faithfully administered the first and the last solemn remedy.

In cases which allowed the cerebro-spinal system room to play, the decided result of this treatment of bark and laudanum thus given, if it did not hinder spontaneous recovery, was to protract the patient's life; and prevent commonly all alvine evacuation* for a considerable, and often almost incredible, period of time. Patients have been known to reach the 18th day without this evacuation. The staying of these evacuations was regarded as favorable, since they were looked upon as the images of death. In some instances, these great and powerful stimulations quenched the hot irritation of the organs, equalized their excitement—staved off the attack—and the sufferers reached health through some after troubles. In the great majority of cases, however, this excitement would not equalize; and the organic edifice sunk promptly down, as the burning house which sinks into the flames that devour it. In the cases in which life would protract under this daily and hourly use of enormous quantities of laudanum, the most often, sooner or later, the excitability exhausted, and the patients become asthenic, expired in the wandering dreams of a sleep, from which they could

* In a letter from a resident physician of Warrenton, he states—"I have made this exact observation; when the bark purges in spite of fate, my patients are pretty sure to recover." In answer, he was recommended to antecede the use of the bark by a cathartic *proprio nomine*; which experience already had strongly suggested to him.

not wake. By a slow and gradual motion they passed away; and the exact boundary line of their death was not always very distinct. The amounts of this medicine patients could bear, without producing perpetual sleep, was truly great in these fevers.

Have any looked into the *arcanum* of medicine with a perfect vision! Have any truly a right to be proud, and exult! When winged disease comes, it comes in the clouds it gathers about it. It pavilions itself in darkness, emblem of the Erebian shadows to which it looks—shadows conceived by a just and wise antiquity. Can any seize the bow of medicine, and direct unerringly its arrows! Like the facts pathological anatomy reveals, the errors of practice in homicidal diseases should be eternally preserved for the benefit of medical mankind, and the diseasable species. It is for this benefit solely, I have attempted to rescue here these errors from oblivion. They may help to guide, where the sun with his fire rains down pestilence. As lonely light-houses radiating a negative light, they may point him his course who battles on the tempestuous seas of meridional disease.

But besides the practitioners of this costive, incendiary treatment, there were others, who pursued a method of management in many respects very opposite. These relied much on the efforts which could be made, and the remedies applied, at the different stages of the disease. Their great objects were, if possible, to mitigate the horrors of the chill, shorten its duration, secure, establish reaction, and check it going too far—in a word, to sustain the equilibrium of the functions, far as practicable, in the revolutions of the fever.

Accordingly, the patient's body was covered over more or less largely as the symptoms demanded with strong mustard plasters; and hot bricks placed round it, rolled up in woollen cloths dipped in brandy. The bed-clothes were drawn tight. These applications were made a short time before the chill, so as to be in full operation when the patient fell into it. In some instances the heat had to be pushed to near scalding before any signs of reaction occurred. Warm red pepper tea was freely administered during the chill.

Most commonly these remedies sufficed for the cold stage. But if the patient continued to sink, hot brandy toddy, with the tinctures of opium and camphor, were freely administered, *pro re nata*, until the warm stage was established. This stage come fully on, a large dose of calomel was given, and worked pretty promptly off with the *pulvis purgans*.* The operation was closely watched; and if it threatened prostration, it was stopped by opium or alcoholic drinks. If the pulse and the heat rose to warrant it, the body was sponged with tepid vinegar and water; or effusions of cold water were kept up, and the patient placed in an airy situation, was fanned constantly to aid the cooling by evaporation. The purging over, the patient took freely cold gum water, lemonade, subacid and calming drinks. Pretty early a large blister was applied over the *epigastrium*, which greatly comforted the tormenting sickness of the stomach, that constantly annoyed; and enabled it to retain the administering remedies.

Blood-letting in any form was generally very doubtful and unsafe; and was admissible in the fewest number of cases. When, however, it could be trusted, or resorted to, it was of the greatest utility. The purging off from the *primæ viæ* the ingesta, the stimulating, acrimonious contents, and the cold effusions afterwards, abated the violence, and kept in pretty good subjection the febrile symptoms.

The chill coming on again, the same means were employed, but in the pyrexia, commonly, the purging was not repeated. The softening, cooling drinks, and the tepid or cold effusions were alone prescribed and relied on.

Under this management, the most often, the violence of these fevers was pretty early subdued, and sometimes intermissions more or less complete were obtained, so as to admit the use of the anti-periodical remedies. Now was a precious moment, a moment of power and triumph to the practitioner, if he seized upon it. But letting it slip, the next step, he might be in the midst of death, and the case hopelessly gone out of his hands. The impetuosity of the fever thus curbed,

* Three parts of cream of tartar, rubbed up with one of jalap.

or intermissions procured, the Peruvian bark in substance with cloves, was instantly given in drachm doses each hour, with ten drops of laudanum; and persevered in long as the patient could bear, or until a sufficient quantity had been taken. The free use of the decoction of the *serp. virginiana* was also commonly prescribed at the same time. Without the laudanum, it was often, nay, almost in every case, impossible for enough of the bark to be retained to arrest the periodical movement, and seize the cure. If the fever relaxed or gave way only a short interval before the expected cold stage, then the bark was swallowed in half ounce or ounce doses, and enough taken at once with a proportional quantity of laudanum, when the patient with his friends around him, waited with solicitude the coming chill. Could he but retain the bark, he was certain to brush by the icicles of this fever, and not feel the cold. Some little excitement followed, when the joyous prospect of recovery was presented fully before him. Again and again I have known patients to retain the bark but ninety minutes, and then instantly pass safely and calmly over the chill, this cold gulf of death, and reach health in a short time. But alas! throwing it up earlier, or before the impression could be made, they plunged; and the vital warmth, as if affrighted at such intense cold, escaped instantly from them, and forever. Often I have seen the bark, retained only thirty minutes, half way dislodge this fever, and cases certainly mortal, become easy of cure.

Had antiquity known this bark, they would have erected it into a goddess; it would have had a Linus or a Meonides to send it down in ceaseless song; and we would read of its altars and worship now in fair and beautiful fable. To the pharmaceutic chemistry, which brought forth quinine from this bark, ought to be raised up a pillar for glory; and for the *connoissance* of gratitude of future mankind. For, if we had had quinine then, we could have snatched from the frozen grasp of this pestilential, epidemic fever, those who perished, because their stomachs were too weak to retain the bark.

But in some instances, I have said, these fevers were immedicable from the commencement; and some died in the first chill even before aid could be had; and some, with aid. In all their violent attacks, they robbed at once, to a greater or less extent, the organism of its dynamical properties. Once falling upon it, its motions become more or less feeble and sluggish; and it did not play up well to the rudder of medicine. The tendency of all depletions was to easily subdue these motions; hence the great caution in their use, and the limited extent to which they could be safely carried. Moderate purging, however, in all cases, was universally borne kindly in the first exacerbations well established, but required to be closely watched, and could seldom be repeated afterwards. Evacuations thus procured and guarded, often invigorated much functional activity; were always extremely comforting to the patient; gave energy and effect, nay, certainty, to the future activity of the bark in arresting the paroxysms. Without their previous use, I always found the bark uncertain in the good expected of it; and its proper action could not be relied on.

The patient passing through the third paroxysm, I have also said, was the most often in but little danger of the freezing death. The fever then continued most all the time in a low form. But the hours at which the chill had previously come, were still fearful and disastrous epochs. In place of the chill, these were now the hours of mortal collapse, cold serous sweats, and death.

A patient thus collapsing, the body was kept dry by constantly wiping off the perspiration. Sinapisms and artificial warmth were applied. Warm toddy of Cog. brandy, with laudanum in large doses, was given *ad libitum*; and the times of administration shortened or lengthened, as the symptoms required, until the case was reached or lost. In the opposite scale of these stimulating forces, death bore with an exceedingly heavy weight. If the practitioner feared for, or became alarmed at, the great quantities of these medicines he had given, and did not stand firm, death instantly snatched his victim from him. This perilous combat, with greater

or less paroxysmal intensity, sometimes lasted for three days; but most often, the fierceness of the struggle was over in twelve hours or less.

The greatest amount of the brandy I ever saw absolutely necessitated for this last period, was three pints; and of the laudanum, strong as could be made, one ounce and a quarter; though Dr. Lucas, of Virginia, in Chapman's Journal of about this time, speaks of much more enormous stimulations in a similar fever.

A few moments after the collapse, the patient fell into a deep and heavy slumber. If the stimulants were not pushed upon him to rouse him up, and make him wakeful, sooner or later, he was sure to expire in the sleep. The hopefulness and unhopefulness of these cases were pretty much in the ratios of the amounts of the brandy and laudanum which would produce wakefulness. If enough could be given to break this slumber, and keep the patient out of it, only a few hours, generally he soon rose above its power, and his recovery was almost certain. I am confident a great number perished for the want of firmness in the practitioners—perished, when a small quantity more withheld, of the brandy and fearful laudanum briskly given, would have broke the sleep, and the hold of death. But such firmness as was here required finds but little room in human bosoms.

Patients rising up out of the collapse were very seldom or never afterwards harassed with fever. They lay calm and peaceful with a sense of great weakness. The joy of recovery before them was visible. Their cases then yielded readily to the tonic and dietetic regimen. Among the tonics, it was generally considered safe to advise the use of the Peruv. bark in some form.

I believe the universal fatality of this epidemic fever among the habitual brandy drinkers, was greatly due to the impossibility of stimulating them.

The fevers of the two years, I treat here, varied but little; that of 1821 excelled perhaps in the mortality.

4. *General observations.*—Cold patients would not stimulate. The action of stimulants given in fearful quantities,

in such a situation, did not appear to extend beyond the containing stomach. The capillary motion of the blood required to be excited first, in order to obtain their diffusible effects. Then a much less quantity sufficed to reach the case. It was, therefore, of the first importance in the chill as in the collapse to keep up the external, artificial heat, and the action of the sinapisms alive. For the want of properly appreciating this sort of excitement, some sunk finally, and perished, whom the stimulation by the stomach would have raised up again and sustained.

The tendeney of all these fevers, with or without treatment, was to terminate in the heavy slumber I have mentioned. The collapse in the chill, or toward the end of their course, was the hour of the sleep. No wild tumult of grief, no noise or agitation of their persons, could often arouse patients from it. In the cold rivers of perspiration they shed, they slept on calmly with a slow and languid pulse. After having thus slept for thirty hours in the absence of assistance, again and again, I have seen them wake up suddenly in their right mind, and continue so, after the brandy and laudanum had been briskly administered, *gradatim*, to a pint of the former, and half ounce of the latter. In the revolution only of thirty hours more, I have seen also, a very small quantity of this brandy, or a few drops of this laudanum, over-excite them.

SECTION IV.

PROGRESS OF DISEASE FROM THE YEAR 1822 TO 1826.—SYNOPTICAL VIEW.

THIS dreadful fever, after 1822, began gradually to decline. It degenerated completely into the common bilious fever of the country by 1826, a case occurring now and then sporadically with the malignant symptoms of the former years.

According, however, to the observations of Dr. John G. Slappy, of Twiggs county, lower down the country, where

the soil rests on the thelasso-zootic limestones, its violence continued with pretty equal intensity until 1824. This physician, who has evinced much solicitude for the improvement of southern medicine, thinks a considerably greater number of cases commenced here in the ataxo-ady-namic form than they did up in the higher regions of the state.

In some of the sporadic cases, occurred a very curious and singular phenomenon. The bile thrown up was a deep indigo blue, or a blue paler, very clear and beautiful. I have seen it cast up the color of gold, and exposed a few minutes to the air, turn suddenly to the one or other of these elegant transparent blues. I know not the molecular change. The blood drawn was very dark and inspissated, but flowing, it quickly changed and resembled the arterial. Sometimes it was whitish from the over proportion of coagulable lymph, but nothing like the milk-white blood of some of the old writers.

In this decline of the epidemic, some of the fevers assumed the character of a very peculiar irritation. They could neither be bled nor purged off. Toward the middle and termination, the more these depletions were reasonably urged, the higher and more persevering they became. The anti-phlogistic regimen pressed until the functions were a little affected, and then a single full dose of opium* defevered,

* In treating of the costive, stimulating practice, I have said above—the merciless attacks of the fevers of 1821–2, were sometimes *staved* off suddenly by pure, enormous stimulations. The powers of opium operating freely eccentrically in crushing great irritations are truly wonderful. I will subjoin an example.—Saw the patient at 9 A. M., in the exacerbation of the second paroxysm of fever. He was in the flower of age; of robust constitution, and habitual, plethory health. Pulse firm, strong, and full; great functional activity; skin very hot, eyes red, fierce, wild, staring; lusty jactitation; delirium coming on—Ordered 18 ounces of blood, and left a cathartic potation with an ounce vial of laudanum, 20 drops to be given in case of over action. The nurse instantly got drunk; and gave him the whole vial in a glass of his toddy, in place of the cathartic.

Saw him again at 2 P. M. He was in a most profuse perspiration—had just woke up from his delirium; looked placid and comfortable; was in his

cured them at once. Besides what I repeatedly saw, Dr. S. Boykin, a minute observer, and excellent physician, communicated to me he had met and cured in this manner, a number of such cases.

Many of the fevers which came before practitioners now, were hard to undo, and set the patient right again. But their mortality was greatly diminished; and after the year 1826, health reigned generally and long over the country.

Could a long series of exact observations on the phenomena of disease of all similar and dissimilar climates, be made, these observations, compared from time to time, would mutually illuminate one another; the great chart of the diseases of the world, at last, might be drawn out; and a medical geography formed, which would tend rapidly to the perfection of the science.

CHAPTER VI.

SUMMARY OBSERVATIONS, MEDICAL LITERATURE, AND CONCLUSION.

THESE atrocious fevers, of which I have now rapidly described the course, the history and treatment, making their assault, soon as we already know, wasted and completely destroyed the dynamical forces of the living organism. Attacking in their greatest fury and strength, they froze the patient to death in a few short hours. In such cases, the cold of the ague gradually increased from the first moment. Soon supervened the deep sleep, from which it was always difficult, and often impossible to arouse the sufferer. With

right mind; said "he felt much refreshed; was perfectly well;" and tendered most kindly his thanks for deliverance.

He recovered from that moment; and, in a few days, reached his wonted health. In such an accident, nothing but certain death could have been reasonably apprehended; but he was saved in the eccentric action of the medicine.

this sleep, came on the sonorous, snorting respiration, the cold viscid perspiration and death. The sleep grew deeper and deeper, the patient becoming less and less excitable from it until the exit. Often the hour of dissolution could be foretold from its growing intensity. In all cases from the first moment, the patient passed rapidly away from under the power of all medicine; and what could be done for his relief required to be done quickly. I have often regretted I had not applied the thermometer to the body of these patients to ascertain how far the cold of these agues, so intense to the touch, fell below the natural standard of the living heat.

In the forms less violent, when these fevers did not kill by the first blow they struck, and would pass on in successive paroxysms, the general loss of physical strength sustained by the patient, was very manifest. After a single revolution, in the apyrexia, the voice of the most robust was much subdued; the pulse less full and more frequent; complete loss of appetite; inaptitude to all motion from a sense of general weakness; respiration easy, but a little hurried; some nausea of the stomach. From the first, the living substance wasted rapidly; and after a few turns of the disease, the ravages of general atrophy were very manifest and striking to the beholder. It was long after recovery before embonpoint was regained.

In some fevers of considerable energy, which authors describe, the body of the patients appears to lose substance very slowly; but these, as I may say, exhausted and drank it up at once. They modified promptly the action of the dynamical forces, which preside over the molecular formation and decomposition of the living parts. They subverted the plastic attraction, which renews the substance of these parts from the torrent of the circulation, while they accelerated the movement of the divellent affinity, which undoes or decomposes them. These two attractions appear to be the same, and essential to the *being* of all the living, as the two attractions of opposite tendencies are to *that* of all the inorganic bodies of nature. And, since these latter are mere phenomena of the equipolence of these two molecular attractions

of opposite tendencies, exist only in this equipolence, so the former or living bodies are phenomena of the equipolence of the two opposite forces of organic formation and decomposition. They exist, and can only exist in this equipoise. These fevers struck at the equipolence of these two great vital forces—struck, consequently, at the fountain whence life derives all its dynamical strength. Hence their great power to destroy. And when the star which shines on medicine shall have reached a greater elevation in the firmament of letters, we may think that future medical philosophers will look on the killing power of all diseases, as solely modified by their capacity to affect the equilibrium of these two great opposite forces which preside over the chemifactions of living bodies. Their measure of strength to jostle this equilibrium will be the measure of severity and death they carry with them.

In some instances, death took place in these fevers before the living power was completely exhausted. In such cases, by literally covering the body with strong, warm, mustard plasters, application of external heat, and hot brandy toddy and laudanum freely administered, again and again, I have seen the sufferers snatched from death near the last sigh. But many cases would not so stimulate, and death coming was sure of his victim. In order to successful stimulation, the importance, the great value of keeping up the external, artificial heat, and of constantly wiping off the viscid perspiration as it flows, preserving the body dry, have been already sufficiently urged. It was very necessary that the practitioner watched closely these heavy stimulations. Most commonly, from 24 to 36 hours and sometimes less, the patient passed completely out from under the exhaustion, when a small portion of these stimuli would over-excite him; and when the same doses he had just previously been taking, would promptly destroy him recovering, and getting out of all danger. In some cases, these exhaustions appeared to be hastened on by the persevering and tormenting pains which seized on the back and lower extremities in the onset

of the paroxysms. The pains were those of breaking the back and legs, of which constant cry was made.

We have seen, that the fevers which visited the country from the settlement of Milledgeville, about the commencement of the actual century, to the year 1826, passed through many changes, and assumed many new and peculiar symptoms. At first, they bore exceedingly heavy on children and those of the juvenile age. But from the years 1810 to 1818, all ages and conditions were alike liable to their assaults. During this period, these inflammatory, bilious fevers did not bear depletions so well. A single copious blood-letting, or a few alvine dejections procured by medicine, sometimes caused prostration, and brought on the most alarming symptoms. The resort to these remedies demanded some caution and care in the practitioner. But after 1818 to the year 1826, these fevers perfectly remodeled, and armed with the most terrific power of death, bore kindly again these depletions. Nay, without their preliminary use, there could be but very little or no hope of recovery from any other treatment.

The fevers, which raged previously to the year 1818, as above, were the common inflammatory, bilious fevers of the country. But those which raged epidemically from this time until 1826, were shaped by causes peculiar to the country then operative—shaped a true pestilence. The autopsy of those who fell victims, showed much inflammation of the gastro-intestinal mucous surfaces; and often the ventricles of the brain were more or less distended by a yellowish, watery secretion.

External, physical causes must guide in the career and revolutions of fevers. The constantly changing forms and symptoms must be due to the operation of such causes. What was peculiar to the year 1818, in which this great and pestilential scourge commenced, was the long drought we noticed. But a drought equally great and persevering in the same country marked the year 1839, in which there was the greatest exemption from disease; and the most perfect health everywhere prevailed. A short time anterior, however, to the period of 1818, there were some occur-

rences entirely peculiar. The summer months throughout of 1815-16 were decidedly the coldest the country has ever witnessed before or since. The newspapers of the day noticed unusual colds approaching to frost, for almost every summer month of these two years.

Could these colds have exerted any influence, operated any way in changing the tenor of disease, and in setting on foot the murderous epidemic, which slaughtered so much in the subsequent years? Do great and small diseases have a rotatory motion, and do they return with their causes in the sequel of years? In the actual state of science, these questions do not admit of response, but we may suppose, in the cumulative observations of ages, in the brighter light medicine will shed, the truth will be approached.

These observations have only commenced in the country for which I write. So far, however, as they have gone, they lean to the rotatory motion of disease. It was observable, the fevers of the year 1836, and afterwards, resembled very exactly those of 1815-16. The scarlatina, which raged with great malignity over Georgia, and most of the Southern States, in the years 1832-3, appeared among us again epidemically, but somewhat tinged with the shades of the prevailing diseases in the actual year, 1844. But where so much doubt and uncertainty exist, we can conclude nothing positively from accidental coincidences like these.

If diseases, the great pestilences, which occasionally devastate the world, have a movement of rotation, their causes must progress forward in the same order. The great masses of matter which move in space, have their cycles, but the molecular fluctuations of bodies, which must exert a great and direct bearing on the health and diseases of countries, of the world, appear but very limitedly, if at all, to be subjected to such order of motion. This subject of the succession and return of diseases, is very obscure. Their relations, however, to external physical agency, which must guide in their career, and fashion the symptoms, are not altogether beyond the power of enterprizing research. Careful observations on the temperatures of years; on the hygrometrical

vicissitudes of the atmosphere ; on the perfect or imperfect ripening of grain and the substances on which we subsist ; and on the changes of countries by the action of man, extended through a long series of years, would be valuable toward such research. From time to time the diseased changes might be compared with the changes of these external modifiers, and the coincidences, the bearings of the one on the other at last, might be detected or reduced to a narrow compass. Such a discovery, could it be made, would give a great flight to hygiene, and the whole science of medicine. Practitioners would then know beforehand the appropriate treatment—what fevers would bear depletions, stimulations, and what would not ; and their judgments and prescriptions everywhere would harmonize to the eternal honor of the healing art.

The field of disease over which we have just hastily glanced, affords the greatest facilities for observation. But in the heavy duties and the fatigues our physicians undergo, these facilities, as too much everywhere, are very imperfectly put to account, and medicine, without the due improvement, descends into the hands of posterity. So much is this so, that the author, in writing these imperfect pages, often in the midst of doubt, trouble and uncertainty, had no written records to consult or console. Dr. Rush has said, that a physician practising through a long life without written notices of the cases he has treated, toward the end of his course loses the most of his experience. In this way much valuable experience is lost, which preserved, would become a flambeau in the hands of medical successors combating old diseases or new ones when they come. Consequently, the registering of the symptoms, and all the peculiarities moral and physical attendant on disease, is indispensable to progressive improvement. And, too, what is a great detriment, the high dialect, in which nature utters human ills, is not in the power of all. She has not been lavish of the ability of seizing the diseased expressions, and of producing the true picture. Hence the black volume of false facts and false experience, which fills the world ; and with brilliant names,

constantly passes to becloud the medical horizon of posterity. When Brown and Broussais wrote, there appeared to be light enough to cure disease. But even in these great men, time has shown, that all is not light which looks like light; and more of the rays of the same precious light they sought, still continues a pressing want. The truth of medicine is truly yielded slowly. In the presence of the majesty of disease, how often have I felt the urgent necessity of this truth—this gray-haired truth—which, like the granite, the adamant of the world, remains all ages the same; and will never disappoint or deceive! How often the fast falling tears of innocence and beauty, of love and tenderness—the sighings, sobbings, the suffocations, heart-breakings about the sick-bed, have sorrowfully forced a sense of its want upon me! And how invaluable was every ray of this truth which could be collected in the treatment of the furious fevers consigned in these pages! How terrible the therapeutic gloom which canopies the languishing bed-chamber, where conquerable death has skulked, and waits for his prey! To seize his arrow from him, and drive him hence; this is a work to do; higher in fame, higher in glory, than any name ever deserved, come from the loins of Mars!

In my long course of practice, I have never seen in Georgia, a true and genuine case of typhus fever, such as Armstrong and the European practitioners describe. Occasionally, we have fevers of a low dynamical power, of which, from the commencement, the medullary organ is the principal laboring seat. Such were those which, some years since, broke out at the Oglethorpe University; and which have appeared, though rarely, at different times and in different places. But their collective symptoms do not quadrate with those of authors. Our bilious fevers unduly depleted in the onset, or depleted too much after they have progressed, and sometimes under any circumstances, are very apt, in some seasons, to fall into the typhous state, and pass for typhus. But this state only indicates the exhaustion of the nervous organ, which played a heavy part in the previous exacerbations; and which, losing its dynamical power,

has sunk down into partial inaction. Besides bilious fevers, scarlatina, pleuritis, and other maladies capable of greatly exciting the functions, occasionally exhibit these same typhous or typhoid symptoms, showing there is nothing peculiar in the cause, and confirming the view here given.

Cases of stone in the bladder are of extremely rare occurrence. I think very few ever necessitate an operation for relief. Phthisis pulmonalis can hardly be said to have a true existence. The organic conformation to it must be great for it to take hold. Its fevers in the various forms, among which the exanthemata are many, that principally vex and urge untimely exit.

Than elsewhere, because of the greater complicatedness and impetuosity of diseases in our southern states, where the vigor of my days has been passed in active duty, it is much more difficult to wield aright the armory of medicine. Recently here, the want of more precise and ample truth, on which to found medical practice, has been more lively felt; and means to this end, accordingly, have been put into operation. Through the enterprize of the late Professor Anthony, who manifested great zeal, and of some other medical gentlemen of Augusta, a respectable medical quarterly was got on foot; and succeeded well for awhile. But since the lamented death of the professor, it has been suspended. The spirit of active inquiry is going on. The medical school at Augusta is extending its influence. The experience, the researches, the investigations—the hard earnings of time—will be put together. The medicine of Georgia, of the south, has yet to take its great flight. The benighted diseases of these countries will show in this light.

THE END.

